

## PRIMARY ENDOMETRIAL APLASIA

## CONGENITAL ABSENCE OF THE ENDOMETRIUM WITHOUT ASSOCIATED ENDOCRINE DYSFUNCTION OR UTERINE HYPOPLASIA

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Absence of the endometrium will obviously result in amenorrhoea. In all reported cases, other than those with concomitant hypoplasia of the uterus, the lesion is due to an acquired disease, either traumatic or inflammatory. The endometrium can be removed by repeated or vigorous curettage, especially during the puerperium.<sup>1-3</sup> It can be destroyed by tubercular endometritis,<sup>4</sup> or by gangrenous endometritis due to severe intrapartum infection with gas-forming organisms.<sup>5</sup> Intra-uterine radium has resulted in destruction of the endometrium without eliminating ovarian function.<sup>6</sup>

An exploration of the literature, however, has failed to reveal any reports of primary amenorrhoea due to congenital absence of the endometrium, without associated uterine underdevelopment. There are records of patients who have had complete amenorrhoea in spite of the fact that the endometrium was present and exhibited the normal response to the ovarian hormones.<sup>7,8</sup> Such patients have even borne children.<sup>9,7</sup> This interesting condition is analogous to the oestrus cycle occurring in animal species without menstruation. In other cases the endometrium, although present, has been found to be inherently unresponsive to the normal hormones.<sup>9</sup> There are also reports of amenorrhoea having been caused by a refractory or absent vascular tree of the endometrium,<sup>10</sup> the remainder of the uterine tissues being normal.

In some of the above-mentioned cases of amenorrhoea, the endometrium was present. In the remainder it was absent; in these cases it had been eliminated by an acquired lesion or else an associated uterine hypoplasia existed. Reports of true congenital absence of the endometrium in a normally developed uterus have not been found in the literature. Nor is such a condition specifically discussed in standard textbooks of gynaecology and gynaecological endocrinology. Since 3 cases of this type were encountered recently at Groote Schuur Hospital, Cape Town, they are reported here.

## CASE REPORTS

## Case 1

C.B., aged 45 years, was first seen on 31 March 1960 complaining mainly of a yellow vaginal discharge of recent origin. On interrogation, however, she gave a history of never having menstruated and, although married for 20 years, she had not been able to conceive. Her breasts, pubic hair and axillary hair developed at the age of 14 years, and she had always been in good health. She had never had any operations or serious illnesses.

On examination her general condition was good, and her haemoglobin was 14 g. per 100 ml. Her breasts were well developed and her pubic and axillary hair normal. A firm non-tender mass was felt in the abdomen, arising out of the pelvis to the height of the umbilicus. The vulva (including the clitoris) and the vagina were normal, except for a discharge

which was shown to be due to trichomonas vaginitis; the cervix was nulliparous and normal; the abdominal mass was found to be incorporated into the body of the uterus; the adnexa were not palpable.

The xenopus pregnancy test was negative. The chest X-ray was normal except for a small calcified focus at the right apex. Vaginal smears indicated good oestrogenization. A buccal smear showed that the nuclear sex pattern was 'chromatin positive' or 'female'. Several 24-hour urine specimens were examined for 17-ketosteroids, 17-hydroxycorticosteroids and pregnandiol; the results were 4.5 mg., 10.4 mg., and 1 mg. respectively.

On 5 April 1960 a dilatation and curettage was done. The uterine sound passed to 2½ inches. In spite of a firm curettage, only very scanty curettings were obtained. Histological examination of these showed that they consisted of multiple fragments of uterine muscle, no endometrium being present.

In view of the large size of the tumour, a laparotomy was done on 13 April 1960. The uterus was found to be of a size corresponding to 20 weeks' pregnancy, due to the presence of multiple fibroids. On opening the cavity of the uterus, it was found to be 2½ inches in length and macroscopically no endometrium could be seen. Both ovaries appeared normal. A total hysterectomy was carried out and a biopsy of each ovary was performed.

Several sections of the wall of the uterine cavity were examined histologically and no endometrium was found. The ovarian biopsies showed normal ovarian tissue, including a corpus luteum, corpora fibrosa and corpora albicantia.

## Case 2

A.P., aged 24 years, was seen on 2 June 1959 complaining of primary amenorrhoea. Her breasts, pubic hair and axillary hair had developed at the age of 14 years. On examination she was a normal-looking but obese woman, with normal pubic and axillary hair and well-developed breasts. On vaginal examination the uterus was normal in size and the vulva and vagina were well developed. However, there was a cystic swelling 2½ inches in diameter in the right adnexal region. The nuclear sex pattern was 'chromatin positive' (20% of nuclei showed sex chromatin). The chest X-ray was normal. A curettage failed to secure any curettings.

Because of the cystic mass, a laparotomy was carried out. The uterus was normal in size and appearance; both ovaries and the left tube were normal; the right tube was the seat of a hydrosalpinx, accounting for the cystic mass felt vaginally. The right tube was removed. The opportunity was taken of doing a hysterotomy and sections of the lining of the uterine cavity were removed.

Histological examination of these biopsies showed complete absence of endometrium. The tube showed a hydrosalpinx with no evidence of tuberculosis.

## Case 3

J.R., aged 22 years, complained of primary infertility and primary amenorrhoea when first seen on 3 May 1959. At the age of 12 years her breasts, pubic hair and axillary hair developed normally. Her general health had always been excellent.

On examination her height was 64 inches, and her proportions were not eunuchoidal. Her breasts were well developed, and the hair distribution was normal. The vulva, vagina and uterus were normal, but there was a cystic swelling about 2 inches in diameter in the left adnexal region. Her nuclear sex pattern was 'female' and the chest X-ray was normal.

A curettage failed to secure any curettings. Because of the presence of the cyst a laparotomy was done. The uterus, ovaries and right tube appeared normal, the cystic swelling being a hydrosalpinx; the latter was removed. Two wedges of uterus were taken for biopsy—these wedges included the uterine cavity; a small biopsy of an ovary was also taken. No endometrium was found histologically in the uterine cavity biopsies. The ovary was normal microscopically. The hydrosalpinx did not show any evidence of tuberculosis.

#### DISCUSSION

The only cause of the amenorrhoea in all 3 cases described here was the absence of the endometrium. In each this was shown by curettage, and was proved by laparotomy and histological examination of several biopsies of the lining of the uterine cavity.

Practically all the evidence indicated that the cause of the absence of the endometrium was a congenital one. None of the patients had ever menstruated or conceived. In each, good breast development and growth of pubic and axillary hair had occurred at the usual pubertal age, vaginal cytology showed normal oestrogenization, and ovarian biopsies confirmed the occurrence of cyclical ovarian function. All this pointed to normal pituitary-ovarian endocrine activity, and congenital absence of the endometrium.

In none of the cases was the uterus hypoplastic. In case 1 it was the seat of multiple fibroids, with no other pathology in the uterus; the adnexa were normal. The cause of the endometrial absence must have been a congenital one. In case 2 the uterus appeared normal. There was no pathology in the ovaries or in one tube but the other tube was the seat of a hydrosalpinx. However, the lesion was strictly unilateral, tuberculosis was not found histologically, and the uterine muscle showed no histological evidence of an inflammatory reaction or other pathology. The findings in case 3 were practically identical to those in case 2. These features, together with the primary amenorrhoea, indicated that the cause of the absence of the endometrium in cases 2 and 3 was, beyond all reasonable doubt, also congenital.

Failure to obtain curettings by ordinary curettage does not mean that the endometrium is absent. In most cases this merely indicates that the endometrium is inactive, and the basal layers (from which cyclical development takes place) are inaccessible to the curette. These layers are normally embedded in the uterine muscle and can only be removed if muscle is curetted away. From the point of view of this investigation it was fortunate that in each of these 3 cases a laparotomy was indicated—this presented an opportunity for taking uterine biopsies and for making thorough histological examination of the uterine cavities. Such histological investigations showed absence of the endometrium in each case.

It is surprising that the condition of congenital absence of the endometrium (the uterus being normally developed) has not, to our knowledge, been reported in the literature. The condition may not be as rare as the literature would indicate.

The true nature of the condition is usually overlooked, because it cannot be proved without biopsies of the lining of the uterine cavity. It is well recognized that the absence of endometrium on curettage is insufficient evidence. In cases where no curettings are obtained it is usually

correctly assumed that the basal layers of the endometrium are present. This cannot, however, be confirmed or disproved without biopsies of the tissue lining the uterine cavity. (The presence of endometrium may become obvious as a result of subsequent bleeding, spontaneous or hormone-induced, but failure to produce endometrial development neither confirms nor disproves its absence.)

#### Treatment

The only possible line of treatment in primary endometrial aplasia is endometrial homo-transplantation. Successes with this procedure in cases of acquired absence of the endometrium have been reported by Westman<sup>10</sup> and by Grunberg.<sup>11</sup> Pregnancies have even followed this procedure.<sup>10,11</sup> Recently, however, doubt has been cast on the ability of such intra-uterine homo-transplants to 'take'.<sup>12,13</sup> The resumption of menstruation may be explained on the basis of postoperative regeneration of small patches of scar-buried, but otherwise normal, endometrium.<sup>12,14,15</sup> The good results obtained by transplantation of Fallopian tubes<sup>13</sup> has also been attributed merely to the provision, by the transplant, of space for remnants of the original endometrium to regenerate.<sup>12,14,15</sup> However, treatment of such congenital absence of the endometrium by dilatation or repeated probing of the endometrial cavity (as recommended for the acquired condition)<sup>3,5,6</sup> would be valueless, because in the congenital cases intra-uterine adhesions are not responsible for the amenorrhoea.

Whether endometrial or tubal homo-transplantation can in fact be successful, could be proved in cases of congenital absence of the endometrium, such as these. This method of treatment is being considered in the 2 younger patients reported here.

#### SUMMARY

1. The literature on amenorrhoea caused purely by endometrial pathology is reviewed.

2. Where the endometrium is absent, this is nearly always due to acquired disease, either traumatic or inflammatory. No case of proved congenital absence of the endometrium with a normally developed uterus and with normal pituitary-ovarian function has been encountered in the literature.

3. Three such cases of absence of the endometrium are therefore reported. Evidence is adduced to show that the cause in each case was congenital, and the symptoms, diagnosis and possible lines of treatment of this condition are discussed.

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## AANPASSINGSPROBLEME VAN DIE GETROUDE VROU WAT BUITENSHUIS WERK

Die getroude vrou wat buitenshuis werk, is 'n maatskaplike verskynsel wat kenmerkend geword het van die moderne tyd. Daar is begrypklarer wys verset teen dié verskynsel, maar dit is 'n ekonomiese en maatskaplike ontwikkeling wat, ten spyte van alle verset daarteen, steeds toeneem. Die getroude vrou wat ná haar huwelik nooit weer buitenshuis werk nie, is vandag 'n hoë uitsondering. Verreweg die meeste vroue doen ná hul huwelik vir korter of langer tydperke betaalde werk buitenshuis. Die meeste jong meisies wat trou, werk buitenshuis totdat hulle die eerste baba verwag. Baie vroue begin weer werk sodra hulle kinders skoolgaande ouderdom bereik. Sommige vroue werk met kort tussenposes dwarsdeur hulle huweliksjaare. Sommige doen deeltydse werk. Slegs 'n klein persentasie vroue slaag daarin om hulle vir die duur van hulle huwelik uitsluitend aan hul huishouding en hul gesin te wy. Die getroude vrou wat buitenshuis werk, is dus 'n verskynsel waarmee daar deeglik rekening gehou moet word, veral ook deur die geneesheer wat, naas die liggaamlike welsyn van sy pasiënte, ook hul emosionele en geestelike wel of wee as sy verantwoordelikheid aanvaar.

Om die getroude vrou wat werk, sonder meer te verdoem, is uiters kortsigtig. Feit is dat verreweg die meeste vroue wat werk dit glad nie uit verkiesing doen nie. Dit geld veral die laer inkomstegroepe. Die lewenskoste styg voortdurend. Selfs die noodsaaklikste lewensmiddele word steeds duurder en duurder. Behuising kos méér as wat dit ooit van tevore gekos het. Die pryse van kleren en skoene is buitensporig hoog. Vir die meeste getroude pare met kinders word die stryd om die bloot materiële lewenspeil te handhaaf só moeilik dat hulle net nie kán byhou as die vrou nie ook verdien nie.

Daarby kom die onweerlegbare feit dat die verbruiks-goedere wat te koop aangebied word, by die dag in verskeidenheid en hoeveelheid toeneem. Almal sonder uitsondering is blootgestel aan die psigologiese ondermyning van nimmer eindigende reklame wat net één doel het: om die behoeftes van die potensiele koper te vermeerder en te beklemtoon. Om al dié dinge te koop, kos geld. En dié geld moet verdien word, so nie deur die man nie, dan deur die vrou, sy wat by uitstek die handelsreklame ten prooi val.

In sekere beroepe veroorsaak die nypende tekort aan opgeleide personeel wydverspreide kommer. Die bewustheid van dié heersende tekort is 'n sterk impetus vir die getroude vrou om ná haar huwelik voort te gaan met haar beroep. Sekere beroepe soos die onderwys, verpleging, en maatskaplike werk sou ernstig belemmer word as hulle vandag die dienste van getroude vroue moet ontbeer. Daar word ook al hoe meer gebruik gemaak van die arbeid van getroude vroue in klerklike betrekkings, in die joernalistiek, in fabriek en winkels, in wasserye, hotelle, en restaurants. Die vraag na die arbeid van die getroude vrou het tot op groot hoogte die beperkings, waaraan sy geslagte lank onderhewig was, uit die weg geruim sodat dit, wat die buitewêreld betref, vandag vir haar makliker is om werk te kry as ooit van tevore.

Verder is dit nog 'n onweerlegbare feit dat verreweg die meeste vroue hul mans oorleef en gevolglik 'n tydperk van weduweeskap tegemoet gaan wanneer hulle deur ekonomiese druk gedwing word om te werk, onverskillig van wat hulle omstandighede tuis mag wees. Die getroude vrou wat vandag ná haar man se dood finansieel so goed versorg is dat sy nie hoef te werk vir 'n verdienste nie, is 'n hoë uitsondering.

Dit is dus 'n oppervlakkige beskouing van die probleem om aan te neem dat dit sommer maar 'n wispelturige drang na avontuur en gebrek aan pligsbesef is wat die getroude vrou buitenshuis werk laat doen. Die feit van die saak is dat die lewe van die gemiddelde getroude vrou vandag meer gekompliseerd is as ooit in die verlede. Sy is aan meer spanning en verskeurdheid blootgestel as die vrou van vroeër geslagte. Die eise wat aan haar gestel word en wat sy aan haarself stel, is strawwer as wat die meeste mense ooit besef. Daarom moet sy kan aanspraak maak nie net op 'n beter begrip van haar situasie in die samelewing nie, maar ook op verstandige leiding en daadwerklike hulp van diegene wat by magte is om haar daardie leiding en hulp te kan gee. Onder hulle is een van die eerstes tot wie sy haar behoort te kan wend — haar eie geneesheer.

Die allergrootste probleem vir die getroude vrou, wat werk, is die versorging van haar kinders. Die oplossing van dié probleem lê nooit daarin dat die kinders tuis deur 'n bediende opgepas moet word nie. Ter wille van die moeder se gemoedsrus en in die kind se eie beswil is dit noodsaaklik dat 'n ander oplossing gevind moet word. Die ideale toestand is natuurlik dat die kind onder die moeder se sorg moet kan bly totdat hy minstens drie jaar oud is en na 'n kleuterskool kan gaan. Die bewaarskool of crèche vir heel klein kindertjies vind nog nie algemeen byval in ons land nie. Tog, waar dit nie anders kán nie, is dit beter om 'n kind by 'n goederingerigte bewaarskool te laat liever as tuis in die sorg van 'n onbetroubare bediende. 'n Moontlike oplossing ten opsigte van die versorging van klein kindertjies is dat vroue mekaar sal begin help: dat één vrou die versorging van 'n paar kleintjies op haar sal neem teen vergoeding terwyl die moeders weg is by hul werk. Dit is die soort onderneming wat 'n afgetrede verpleegster ook op haar sou kon neem.

Die vóóroordeel, wat nog by sekere mense teen die kleuterskool bestaan, is geheel en al ongegrond. Verreweg die meeste kinders tussen drie en vyf jaar trek groot voordeel uit die bywoning van 'n kleuterskool. Die kinders is daar onder goeie sorg, dikwels baie beter as by hul eie huise al is die moeder ook tuis. Hulle kry spesiale aandag, hulle leer om hulle sosiaal aan te pas en hulle bly produktief besig.

Dit is belangrik om in te sien dat die sekuriteit en stabiliteit wat kinders nodig het om gesond te ontwikkel, nie in die eerste plek uiterlike sekuriteit is nie, maar *emosionele sekuriteit*. Waar die ouers gelukkige, goed-

aangepaste mense is, is dit nie van die eerste belang dat hulle die hele dag lank fisies naby die kind hoef te wees nie. Jeugmisdaad ontstaan daar waar kinders die sekuriteit van ouerliefde moet ontbeer, waar hulle emosioneel verwaarloos word en geestelik honger ly — nie daar waar hulle 'n paar uur op 'n dag in 'n kleuterskool deurbring nie. Soos die patroon van die moderne samelewing ontwikkel, ontstaan die behoefte aan baie méér kleuterskole. In Engeland is daar reeds 'n begin gemaak met spesiale kleuterskole — vir die kinders van getroude verpleegsters, die kinders van getroude onderwyseresse, ens. Miskien is dit 'n rigting wat ook in ons land met vrug gevolg sal kan word.

Die probleem omsluit egter veel méér as die versorging van kinders. Om 'n voltydse betrekking daarop na te hou en terselfdertyd ook 'n huis en 'n gesin te versorg, veronderstel heelwat organisasievermoë en heelwat energie, liggaamlik en geestelik. Waar die vrou en moeder buitenshuis werk, moet die tradisionele lewenspatroon gewoonlik heelwat gewysig word. Dit vra aanpassing van man en kinders. In dié opsig kan die geneesheer soms op die regte psigologiese tydstip goeie leiding gee. Waar dit blyk dat

die vrou aan te veel spanning onderhewig is, kan hy taktvol daarop wys dat die huishoudelike arbeid miskien 'n bietjie meer eweredig verdeel behoort te word, dat daar miskien 'n bietjie meer voorsiening gemaak moet word vir rus en ontspanning vir die moeder, dat die vrou self miskien daaraan moet dink om van werk te verander of om moontlik liever 'n deeltydse betrekking te probeer kry.

Wanneer jong meisies vandag 'n beroep kies, is dit belangrik dat die moontlikheid van buitenshuise werk ná die huwelik in gedagte gehou word. 'n Vrou wat vandag in geen rigting opgelei is nie, het 'n baie onsekere toekoms. Die geneesheer behoort sy invloed te gebruik om ouers aan te moedig om hulle dogters sover moontlik vir die een of ander betrekking te laat oplei sodat hulle nie onvoorbereid uitgelewer word aan die genadelose stryd om te bestaan nie.

Die wesentlike behoeftes van die getroude vrou en die veeleisende aanpassing wat daar van haar in 'n vinnig veranderende wêreld geverg word, bied ongetwyfeld 'n vrugbare terrein vir navorsing, ook van die kant van die mediese beroep.

### CORONARY VASODILATORS

Apart from the central nervous system the heart is more susceptible to lack of oxygen than any other important organ in the body. Cardiac muscle cannot run into oxygen debt, thus differing from skeletal muscle which can enter into extensive oxygen debt. The heart's activity depends from minute to minute on an adequate supply of oxygen and thus on the efficiency of the coronary circulation. Angina pectoris results if the oxygen supply to the myocardium falls short of its requirements.

On this basis it is presumed that agents which relieve the pain must dilate the coronary arteries and improve the coronary blood flow. It is also presumed that since nitrites relax smooth muscle, including that of the arterial system, they relieve anginal pain by relieving coronary artery spasm. All this reasoning is possibly true, but neither of the presumptions is proved, because no direct observations of coronary-artery spasm during an anginal attack or of relaxation of spasm by a nitrite have been directly observed.

In myocardial infarction pain develops in its severest form due to hypoxia of the myocardium. It is resistant to the coronary vasodilators and may be difficult to relieve even with analgesics such as morphine.

The drugs which have been used to dilate the coronary arteries are relatively non-specific. The nitrites relax all smooth muscle, but in general the arterioles are more sensitive to this action. It may be that nitrites exert a relatively specific effect only in the presence of abnormal sensitivity, as in coronary-artery spasm, where small doses may cause relief without inducing a systemic effect. This implies that they may be of little value for improving coronary circulation when there is no spasm. A drug with rapid action is desirable, and once the pain disappears no further drug action is necessary. Therefore, with the long-acting vasodilators rest may relieve the pain before the pharmacological action of the drug comes on, and they

continue to exert their effects long after the need has disappeared. Thus for the relief of an attack of coronary pain the rapidly-acting type of drug is most desirable. Many drugs with slow action have been introduced to prevent attacks or to provide a continued action which will dilate the artery in spasm promptly and relieve pain virtually before it develops. There are no properly substantiated answers to this problem. The literature contains many contradictory statements on this subject. Many of the investigations and studies have been poorly planned and not properly controlled.

The nitrites are extremely useful in the relief of the acute attack of angina. Usually glyceryl trinitrate tablets are best. Amyl nitrite is no longer official (*B.P.*) but is recommended by some when a very rapid action is desired. Swallowed glyceryl trinitrate (nitroglycerin) is useless since the drug is destroyed in the liver. The effects develop after sublingual administration, taking a little longer to come on but having a more prolonged action than nitrite administered by inhalation. The dosage form is fixed and is thus controlled by the physician rather than by the patient. It is safer for use in the physician's absence. Many long-acting drugs in this 'nitrate' group have been introduced but they have not become widely established.

A large group of agents which are monoamine oxidase inhibitors (iproniazid, isocarboxazid, phenelzine, nialamide) have become available. They have an action on mood, so-called 'psychic energizers'. Some of them may prove to be helpful in angina but it is well to view them with caution. Aminophylline and theobromine were used for many years for angina but, as with so many of the newer drugs, comparison with placebo has failed to reveal any special benefit from them.

A number of drugs are effective in angina. The nitrites are the only drugs which can be relied on to dilate

coronary arteries and relieve anginal pain. Other drugs reputed to have these actions have not been established as effective or reliable. Nitrites fail, however, to provide prophylaxis, possibly because of the development of

tolerance. What is needed is a drug belonging to another chemical or pharmacological group against which tolerance does not develop.<sup>1</sup>

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## THE USE OF 'TRINURIDE' (PHENYLETHYLACETYLUREA) IN THE TREATMENT OF EPILEPSY

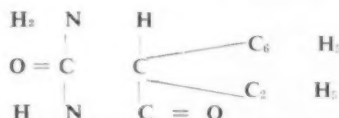
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Favourable results in the treatment of epilepsy with 'trinuride' were first reported by Frommel *et al.*<sup>1</sup> Sorel and de Smedt,<sup>2</sup> and Furtado.<sup>3</sup> These workers found this preparation to have an effective anticonvulsant action over a wide range of clinical forms of epilepsy. As there have been few accounts in the current British literature on the observations of the anticonvulsant action of 'trinuride' on epilepsy, we feel that our observations on 21 patients treated with this drug over the past 2 years are worth recording.

### Pharmacology

The important ingredient of 'trinuride', which is reputed to have a useful adjuvant or even specific activity, is phenylethylacetylurea. The elaboration of this active principle was derived from a chemically related substance, phenylacetylurea, better known as 'phenurone'. This compound had previously found wide application particularly in the USA, but later was found to have serious toxic side-effects on the haemopoietic, hepatic, and renal functions. Phenylacetylurea possesses the following structural formula:



It contains the basic chemical skeleton of 3 C, 2 O and 1 N, which is found in the closed-ring ureides such as phenobarbitone; the hydantoins, e.g. 'epanutin'; the oxazolidines, e.g. 'tridione'; as well as in the pyrimidine-diones, e.g. 'mysoline' and in the succinimides used in the treatment of *petit mal* epilepsy.

One tablet of 'trinuride' contains: phenylethylacetylurea, 0.200 g.; diphenylhydantoin, 0.040 g.; phenobarbitone, 0.015 g.

### MATERIAL AND METHODS

'Trinuride' was given to 21 patients attending the Epilepsy Clinic of the Western Infirmary for periods of 6-24 months. All the patients were observed and treated by one of the physicians of the clinic and the majority were seen by one of us (J.B.G.). Each case record included a full history, a complete clinical and neurological examination, and pertinent laboratory studies, although liver- and renal-function studies were not performed as a routine measure. Electro-encephalographic evaluation was performed in every case before and during therapy with 'trinuride'. For the purpose of neurosurgical assessment, 4 patients had sphenoidal EEG recordings. In 3 of these arteriography was subsequently carried out and in 1 an air encephalo-

gram was performed. No case was subjected to temporal lobectomy. One of the patients, case 16, showed an arteriovenous malformation, but the lesion was inoperable. The series comprises 13 male and 8 female patients ranging in age from 19 years to 55 years. The average age for the group was 35.2 years. In 13 patients seizures had been present for more than 5 years and in 8 for 1-5 years.

Every patient in this series was judged to be suffering from severe intractable epilepsy, although none of the patients was demented. The incidence of seizures among the group was high (see Table I) and the attacks had not been diminished in frequency and severity by various combinations and permutations of standard anticonvulsant drugs.

Twelve patients suffered from *grand mal* epilepsy; 1 of these had *petit mal* in addition. All had tonic-clonic fits of which the patients had no knowledge. The EEG invariably showed generalized paroxysmal dysrhythmia and in some instances spike activity was recorded at random. Nine of the patients were judged to be suffering from focal epilepsy. In this group the striking feature common to all cases was a disturbance in the normal pattern of behaviour, with concomitant disturbance of affect. These patients have been said to have psychomotor epilepsy, epileptic equivalents, or temporal lobe epilepsy. In addition 5 of these patients were subject to recurrent major convulsions.

The process of substitution of 'trinuride' for previous forms of medication was gradual and effected over a period of 4-5 weeks. We generally observed the following routine:

1st week. The existing medication was left unchanged, but to this 1 'trinuride' tablet was added.

2nd week. Two 'trinuride' tablets daily were commenced and the original therapy halved.

3rd week. The 'trinuride' was increased to 1 tablet 3 times a day with further reduction of phenobarbitone or any other anticonvulsant the patient may have been taking.

4th week. 'Trinuride' was increased to 4 tablets a day — 2 morning and evening, with a corresponding reduction in other anticonvulsants. (The dosage thereafter was adjusted to individual needs and tolerance.)

This trial took place on ambulant patients who regularly attended the neurological clinic, though several were initially admitted to hospital for special neuroradiological investigations and commencement of therapy.

We did not attempt to control our cases using 'trinuride' alone and, in some, phenobarbitone, 'epanutin' and 'mysoline' were retained but at a greatly reduced level of dosage. The daily dosage of 'trinuride' in each individual

TABLE I. OBSERVATIONS ON 21 PATIENTS TREATED WITH 'TRINURIDE'

Case	Sex	Age	Nature of attacks	Duration of epilepsy		Average monthly no. of major attacks before 'trinuride' therapy*	Average monthly no. of major attacks on 'trinuride' therapy	Daily no. of 'trinuride' tablets	Results
				More than 5 years	Less than 5 years				
1	F	24	Temporal lobe .. .. .		+	8	5	3	Markedly improved
2	M	39	Temporal lobe .. .. .	+		6	3	3	Markedly improved
3	M	31	Grand mal .. .. .	+		5	8	4	Improved
4	F	26	Temporal lobe .. .. .		+	5	Discont.	4	Worse
5	M	19	Grand and petit mal .. .. .		+	5	Discont.	3	Worse
6	M	41	Temporal lobe .. .. .	+		5	1	4	No change
7	M	23	Grand mal .. .. .		+	5	2	5	Markedly improved
8	M	25	Grand mal .. .. .		+	5	0	4	Markedly improved
9	F	37	Temporal lobe .. .. .	+		4.5	0	4	Markedly improved
10	M	44	Temporal lobe .. .. .	+		—	—	3	Markedly improved
11	M	43	Grand mal .. .. .	+		10	9	4	No change
12	M	51	Grand mal .. .. .	+		5	Discont.	4	Worse
13	M	29	Grand mal .. .. .		+	5	6	4	No change
14	F	27	Temporal lobe .. .. .		+	—	—	3	Markedly improved
15	F	55	Grand mal .. .. .	+		5	1.5	4	Markedly improved
16	M	29	Temporal (A-V lobe anomaly) .. .. .	+		2	0.5	5	Markedly improved
17	M	36	Grand mal .. .. .		+	7	1.5	4	Markedly improved
18	F	27	Temporal lobe .. .. .	+		4	1	4	Markedly improved
19	F	49	Grand mal .. .. .	+		5	3	4	Improved
20	M	40	Grand mal .. .. .	+		5	3.5	3	Improved
21	F	49	Grand mal .. .. .	+		5	2	4	Improved

\* Based on the average monthly number of attacks during the 6 months preceding commencement of 'trinuride' therapy.

case is given in Table I. It is important to mention that a daily dose of 4 'trinuride' tablets contains 1 gr. of phenobarbitone.

#### RESULTS

We assessed the 2 groups of general and focal epilepsy separately. In observing the results of treatment we employed 4 categories:

1. *Markedly improved*: Between 75 and 100% reduction in frequency of attacks.

2. *Improved*: Between 25 and 50% reduction in frequency of attacks.

3. *No change*: The same frequency of attacks or only a slight percentage improvement.

4. *Worse*: Increased frequency of attacks.

Thus in the group of generalized epilepsy the analysis was: 4 markedly improved; 4 improved; 2 no change observed; and 2 worse.

In the patients manifesting temporal lobe attacks, the improvement was most satisfactory. Seven patients were markedly improved with considerable lessening in psychic and psychomotor auras and general improvement in behaviour. This designation of marked improvement also applied to the major convulsions to which these cases were subject.

One patient showed no change and one became worse, with aggressive outbursts and increased major attacks.

#### Side-effects

These have been carefully studied by Sharpe, Dutton, and Mirrey.<sup>4</sup> In a series of 32 in-patient mentally defective epileptics, they made routine blood counts, liver-function studies, urinary analysis, and blood-urea estimations. They stated that 'trinuride' had no deleterious effect on the haemopoietic system. Liver-function tests did not reveal any gross changes, and the urine, apart from traces of glucose and albumin, was normal.

We did not observe any clinical side-effects although routine laboratory studies were not regularly performed.

Slight excitability, however, occurred in 2 patients, insomnia was complained of by another, and 1 patient with temporal lobe epilepsy became psychotic. Two other patients exhibited ataxia and incoordination which disappeared on lowering the dose of 'trinuride'.

#### DISCUSSION

Analysis of the results of this study show that 'trinuride' possesses marked anticonvulsant properties effective in *grand mal* and particularly in temporal lobe epilepsy. Thus we found that 8 of the 12 patients with severe generalized epilepsy were improved. Even more gratifying improvement was noted in the behaviour patterns and severity of major convulsions among the group manifesting temporal lobe disturbances.

Similar observations on general behaviour and mental state have been recorded by Ruggeri,<sup>5</sup> but were not seen by Sharpe, Dutton, and Mirrey.<sup>4</sup> This may have been due to the fact that these patients were certified mentally defective with very low IQ's. We feel that this drug is certainly worth further study since it appears to have considerable anticonvulsant properties when used in the treatment of clinical epilepsy.

#### CONCLUSION

'Trinuride' was given to 21 adult epileptic patients attending the Neurological Clinic of the Western Infirmary. Eight patients with generalized epilepsy were improved with the medication. In 6 out of 8 patients with severe temporal-lobe seizures there was a most gratifying response. Providing that the drug is carefully administered in the transition period, it is easy to handle and remarkably free from complications. There were few side-effects in this limited series.

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## HEART DISEASE IN PREGNANCY

BASED ON A REVIEW OF 284 CASES SEEN AT THE MATERNITY HOSPITALS CONTROLLED BY THE UNIVERSITY OF CAPE TOWN

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There has been considerable improvement during recent years in antenatal care, blood transfusion techniques, antibiotics and operative obstetrics. The number of maternal deaths due to toxæmias of pregnancy, haemorrhage, sepsis and other obstetric complications has therefore fallen considerably. As a result, cardiac disease is today a far more important cause of maternal mortality and postpartum invalidism than it was, and in some series it has become one of the commonest causes.<sup>1</sup> In spite of this it has been shown that, in the light of our modern understanding of the disorder, proper management can reduce the mortality to zero.<sup>1,2</sup> Accordingly, an analysis has been made of a large series of cases which were treated in our own institutions in Cape Town.

All the cases of cardiac disease associated with pregnancy which were seen in the 4-year period, 1953-1956, in the teaching maternity institutions controlled by the University of Cape Town, were analysed. During this period there were 30,980 deliveries. Among these, 284 patients were found to have a cardiac lesion; this represents an incidence of a little over 1%. The incidence reported in the literature varies from 0.45% to 3%.<sup>3-7</sup> An analysis of the ages of the patients shows that the

TABLE I. AGE INCIDENCE

Age	No. of cases	%
Below 20 .. ..	31	11
20 - 24 .. ..	99	34.9
25 - 29 .. ..	64	22.7
30 - 34 .. ..	44	15.4
35 and over ..	46	16

commonest age incidence is between 20 and 24 years, followed by the 25-29 year age-group (Table I).

The findings in this series can be summarized as follows: total number of cases 284 (booked 217, unbooked 67); maternal mortality 8 (2.7%); stillbirths 12; neonatal deaths 6; undelivered fetuses 3; abortions (induced 4, spontaneous 5) 9; total foetal loss 30 (10.4%); number of viable babies 256; and mothers booked elsewhere 2.

#### GRADING ACCORDING TO DEGREE OF COMPENSATION

The cardiac functional capacity of each patient was assessed both on admission and on delivery. Patients were graded into 4 groups as recommended by the New York Heart Association.<sup>8</sup>

Grade I: Signs of organic heart disease are present but the patient is symptomless and has no limitation of activity.

Grade II: The patient has slight limitation on moderate activity.

Grade III: Definite limitation develops after any activity and signs of incipient failure are present.

Grade IV: There is complete limitation and signs of cardiac failure are present even at rest.

On admission 164 patients of the 284 in this series were assessed as being in Grade I, 67 in Grade II, 22 in

Grade III and 31 in Grade IV. At the time of delivery, 2 patients had been booked elsewhere for delivery, and 3 patients had died. Of the remaining 279 patients, 182 were now in Grade I, 68 were in Grade II, 19 were in Grade III and 10 were in Grade IV.

#### TYPE OF LESION

We consider it a most important aspect of the treatment to be in consultation with the Cardiac Clinic of Groote Schuur Hospital. All cases, as far as possible, are therefore thoroughly examined and diagnosed by a cardiologist. The lesions in the 284 patients in this series were as follows:

#### A. Rheumatic Heart Disease — 253 (89%)

##### 1. Mitral Lesions

(a) Pure mitral stenosis .. .. .	147
(b) Pure mitral incompetence .. .	13
(c) Mitral stenosis with other valvular lesions .. .	71

These included the following associated lesions: mitral incompetence 33, aortic incompetence 22, aortic stenosis 7, aortic stenosis and incompetence 1, aortic stenosis with tricuspid stenosis and incompetence 1, aortic and mitral incompetence 4, and aortic stenosis and incompetence with mitral incompetence 3.

(d) Mitral incompetence with other valvular lesions .. .. .	2
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These were: tricuspid incompetence 1, and aortic incompetence 1.

##### 2. Aortic Lesions

(a) Pure aortic incompetence .. .	9
(b) Pure aortic stenosis .. .. .	7
(c) Aortic stenosis and incompetence .. .	3

##### 3. Acute Rheumatic Fever

One patient .. .. .	1
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#### B. Congenital Heart Disease — 13 (4.6%)

1. Patent ductus arteriosus .. .	4
2. Ventricular septal defect .. .	3
3. Tetralogy of Fallot .. .. .	3

These included the following: pure tetralogy of Fallot 1, with Blalock's operation 1, and with associated dextrocardia 1.

4. Pulmonary stenosis .. .. .	2
5. Dextrocardia .. .. .	1

#### C. Hypertensive Heart Disease — 11 (3.9%)

1. Essential hypertension .. .	9
2. Acute toxæmia with pulmonary oedema .. .	2

#### D. Other Miscellaneous Lesions — 7 (2.5%)

1. Toxic myocarditis .. .. .	3
2. Heart block (2:1) .. .. .	1
3. Aortic aneurysm .. .. .	1
4. Paroxysmal tachycardia .. .	1
5. Acute pulmonary oedema following anaesthesia ..	1

#### ANTENATAL CARE

Good antenatal care is of special importance in the management of the pregnant cardiac patient and is a

TABLE II. CASES IN WHICH PREGNANCY WAS TERMINATED

Age	Parity	Maturity	Lesion	Operation	Indication
36	3	14 weeks	Mitral stenosis and incompetence with hypertension	Hysterotomy	Previous cardiac failure and present HPT
24	3	12 weeks	Mitral stenosis and aortic incompetence	Hysterotomy and sterilization	In Grade IV failure
47	17	20 weeks	Hypertensive cardiac failure	Hysterotomy and sterilization	History of CCF and present HPT
24	6	9 weeks	Hypertensive cardiac failure	Hysterotomy and sterilization	History of CCF and present HPT

HPT=hypertension, CCF=congestive cardiac failure.

TABLE III. SPONTANEOUS ABORTIONS

Age	Parity	Maturity	Lesion	Grade on admission	Remarks
39	0	26 weeks	Hypertension	IV	Non-booked
20	0	20 weeks	Mitral stenosis	I	Booked
28	3	22 weeks	Aortic incompetence	III	Booked
37	9	20 weeks	Mitral stenosis	I	Booked
22	0	22 weeks	Mitral stenosis	IV	Booked. Abortion followed valvotomy

major factor in reducing the maternal and foetal mortality. The management programme in our institutions is carried out in the following way:

The patient's cardiac functional state is assessed by her response to exercise early in pregnancy. As much rest as possible is advised throughout pregnancy—at least 12 out of the 24 hours, including 2 hours in the afternoon. The amount of exercise permitted should fall just short of dyspnoea or tiredness and the patient is advised to lead a quiet life and not to go on holiday, etc. The patient is carefully examined every week, if possible. Early signs of failure are looked for. She is weighed and any excessive weight gain restricted. Patients also attend the Cardiac Clinic for consultation. The haemoglobin concentration is checked at short intervals. Any anaemia is vigorously treated for it can precipitate cardiac failure.

In this series, of the 67 non-booked patients, 4 (6%) were admitted with gross anaemia; of these, 3 had serious decompensation and 1 died. Among the 217 booked cases, only 2 (0.9%) (1 with a twin pregnancy) had a mild anaemia.

Respiratory infections (even a common cold) are treated seriously with complete bed rest because of the possibility of their causing cardiac failure. The teeth are carefully looked after to avoid subacute bacterial endocarditis. Protein foods, extra vitamins, and milk are encouraged and salt intake is restricted.

Pre-eclamptic toxæmia is even more carefully watched for than normally because of the extra load placed on the heart by the hypertension and fluid retention. In the non-booked group there were 8 (12%) cases of pre-eclamptic toxæmia, 2 of whom were admitted in Grade IV failure and 1 in Grade III; the patient in Grade III went into acute pulmonary oedema and her baby was stillborn. One other patient had to be delivered by Caesarean section after a failed induction; her baby was also stillborn. Among the booked cases there were 8 patients (3.7%) with pre-eclamptic toxæmia, 2 of whom had twin pregnancies. There were 4 stillbirths and 1 neonatal death, 1 of the pairs of twins surviving.

Any cases falling into Grades III or IV are admitted

to hospital and treated with absolute bed rest, restricted fluid intake, sedation, digitalization and diuretics. If possible, no obstetrical interference should be carried out until the cardiac failure has been controlled. Cardiac failure usually threatens about the 28th–32nd week when the load on the circulation has reached its peak. All cardiac patients, therefore, are admitted during this period for re-assessment and bed rest. It will be noted that 5 (62%) of the deaths occurred in this period. A week before term all cases are admitted for rest and reassurance and to prevent the occurrence of any infection.

#### Termination of Pregnancy

Therapeutic abortion is considered (a) in patients before the 20th week of pregnancy who remain in Grade III or IV without response to treatment, or (b) in patients with a history of previous cardiac failure where the cause is still present and is likely to recur.<sup>3,9</sup>

Others express the view that there is never any indication for termination in women with heart disease, no matter how severe it is.<sup>10</sup> The termination of pregnancy after the 12th week, however, requires an abdominal operation and, should therapeutic abortion be necessary, it must, if possible, be done before this time.

In the present series hysterotomy was performed on 4 (1.3%) cases, all unbooked patients. However, hypertension was the main indication in 3 of these. All 4 cases survived (Table II). There were many other patients in this series who were allowed to go to term, although they had cardiac compensation as poor as, or worse than, these 4.

#### Spontaneous Abortions

There were 5 (1.6%) spontaneous abortions in the series (Table III). In all, 3 of the 5 cases fell into the unfavourable Grades III or IV. The 5 abortions all occurred between the 20th and 26th weeks. This would seem to support the view that abortions are more common in the severe cardiac case. In the 284 cases reviewed, 46 (16%) women gave a history of one or more abortions. However, in 200 control cases, 51 (25.5%) women gave a similar history. On the whole, therefore, abortions appear less common among cardiac cases, one of the possible reasons being the better antenatal supervision they receive.

### Results of Antenatal Supervision

The importance of antenatal supervision is illustrated very forcefully by an analysis of the results in the booked and non-booked cases. The maternal mortality was twice

TABLE IV. MATERNAL AND FOETAL MORTALITY IN BOOKED AND NON-BOOKED CASES

	Maternal deaths	Stillbirths	Neonatal deaths
Booked cases ..	5 (2.3%)	6 (2.8%)	3 (1.4%)
Non-booked cases ..	3 (4.5%)	6 (8.9%)	3 (4.5%)
Total ..	8	12	6

as high in non-booked patients. In addition, both the stillbirth and neonatal death rates were more than 3 times as high in this group (Table IV).

Tables V and VI demonstrate that at delivery 7.15% of the booked cases were in Grades III and IV, whereas

TABLE V. GRADING ON ADMISSION AND DELIVERY OF BOOKED CASES

Grade on admission	Number of cases	Grade on delivery	Number of cases
I	141	I	135
		II	3
		III	1
		IV	—
		Booked elsewhere	2
II	46	I	13
		II	32
		III	—
		IV	—
		Deaths	1 (in labour)
III	14	I	2
		II	7
		III	3
		IV	2
		Deaths	—
IV	16	I	3
		II	2
		III	5
		IV	4
		Deaths	2 (undelivered)

The patients who were in Grades III and IV on admission (30), represented 13.8% of the total, while those in Grades III and IV on delivery (15) were 7.15% of the total.

in the non-booked cases the corresponding figure was much higher (20.8%). On admission there was a similarly significant difference in the grading of the two groups (13.8% as against 34.3%).

### LABOUR, DELIVERY AND THE PUERPERIUM

Management of the pregnant cardiac case in labour and at delivery in our institutions is as follows:

Patients are admitted to hospital for the week before term. Accurate pelvic assessment is done to ensure that spontaneous normal labour is possible. Liberal sedation is the rule throughout labour to alleviate any pain or apprehension. The usual drugs prescribed were morphine, gr. 1, or pethidine, 100 mg.; these were repeated or followed by 'sodium amytal' or phenobarbitone if necessary. Penicillin, 500,000 i.u., was administered twice daily during labour as prophylaxis against subacute bacterial endocarditis. Digitalis folia or, if necessary, digoxin, are usually given to patients in Grades III or IV. These patients may also require aminophylline and oxygen. Venesection is

TABLE VI. GRADING ON ADMISSION AND DELIVERY OF NON-BOOKED CASES

Grade on admission	Number of cases	Grade on delivery	Number of cases
I	23	I	22
		II	—
		III	—
		IV	1
II	21	I	4
		II	17
		III	—
		IV	—
III	8	I	2
		II	2
		III	4
		IV	—
IV	15	I	1
		II	5
		III	6
		IV	3

The patients who were in Grades III and IV on admission (23) represented 34.3% of the total, while those in Grades III and IV on delivery (14) were 20.8% of the total.

occasionally performed as a last resort. Finally, strict attention is paid to nutrition and excretion.

### The Second Stage

All efforts on the part of the patient must be kept to a minimum, especially in the more serious grades. Where anaesthesia is necessary, gas and oxygen are used if cyanosis is present, otherwise a pudendal block, which is preferable, is done. This prevents pain and delay, especially in primigravidae, and allows for immediate episiotomy.<sup>3</sup> It is often said that forceps should be applied as a routine in cardiac cases. In this series, however, forceps were only applied in 33 (10.4%) cases. Ten of these were in Grades III or IV. This would seem to bear out the theory that the second stage in these patients is short. Recent work

TABLE VII. TYPE OF DELIVERY IN RELATION TO GRADING

Grade	Spontaneous vertex	Forceps	Caesarean section	Arm and leg spontaneous vertex	Assisted breech	Spontaneous breech	Breech extraction	Hysterotomy	Spontaneous abortion	Born before arrival	Total
I	149	11	7	—	—	—	—	—	—	—	182
II	49	10	4	—	—	—	—	—	—	—	68
III	11	5	—	—	—	—	—	—	—	—	19
IV	2	3	—	—	—	—	—	—	—	—	10
Total	211	29	12	5	3	4	2	4	5	4	279*

\* Apart from these 279 cases, 5 were undelivered.

on this subject, however, suggests that there is in fact no significant difference in the length of labour in cardiac cases and in normal women.<sup>11</sup> The methods of delivery are related to the functional grade at delivery in Table VII.

### The Third Stage

This is managed as in any normal patient except that ergometrine is never given unless a severe postpartum haemorrhage occurs. The effect of ergometrine is to cause contraction of the myometrium, thereby forcing extra blood into the circulation and causing prolonged closure of the uterine arteriovenous shunt. Both these factors may put an extra strain on the heart.<sup>12</sup>

It is important to allow normal separation of the placenta; attempts at manual removal are liable to cause

TABLE VIII. MATERNAL DEATHS

Booked or non-booked	Age	Maturity	Grading		Delivery	Time of death	Lesion	Child
			Adm.	Del.				
1. Booked	23	32	IV	—	Undelivered	10 hrs. after admission	Mitral stenosis. Aortic incompetence	—
2. Booked	40	34	II	—	Undelivered	36 hrs. after admission	Mitral stenosis. Hypertension	—
3. Booked	26	32	IV	—	Undelivered	2 weeks after admission	Mitral stenosis	—
4. Non-booked	31	27	IV	IV	Internal version & breech extraction	At delivery	Mitral stenosis	Stillborn
5. Booked	30	32	IV	IV	Forceps	15 hrs. after delivery	Mitral & aortic stenosis	Still born
6. Non-booked	33	36	I	I	Caesarean section	2 weeks after delivery	Aortic aneurysm. Hypertension	Live
7. Booked	26	40	I	I	Forceps	Just after the third stage	Mitral & aortic stenosis	Live
8. Non-booked	40	40	I	IV	Caesarean section	6 hrs. after admission	Hypertension. Gross anaemia	Live

Adm. = on admission. Del. = on delivery.

fatal shock. This was fortunately necessary in only 1 case in the present series. As soon as the third stage is over the patients in the more serious Grades III and IV are propped up and morphine is administered. Lacerations or episiotomy incisions are sutured under local anaesthesia.

As always, the third stage is the most dangerous. There is a great danger of sudden collapse, the reason for which is not certain.<sup>13</sup>

#### Caesarean Section

Caesarean section occupies a limited but distinct place in the treatment of patients with heart disease. The operation is never done on cardiac grounds alone but only where a difficult labour is expected or is taking place, to save the mother undue shock or exhaustion.<sup>1</sup>

Caesarean section was performed in 12 (4.2%) cases in this series. These figures are similar to those of MacRae's series where the incidence was 4%.<sup>1</sup> O'Driscoll *et al.*,<sup>14</sup> however, performed the operation in only 0.7% of their cases.

Caesarean section should not be lightly undertaken for it has been found that in Grade III or IV patients undergoing the operation the mortality rate is 12%.<sup>15,16</sup> The only Grade IV case on which a Caesarean section was done in this series died a few hours later.

The anaesthetic used was usually gas and oxygen with trilene or ether. Provided that the anaesthetist is skilled there is little risk with inhalation anaesthesia; cardiac patients stand it satisfactorily unless they are in failure. Thiopentone sodium must be avoided at all costs since it may cause a disastrous drop in blood pressure.<sup>17</sup> The same applies to spinal anaesthetics which may result in hypotension followed by deficient coronary circulation and interference with respiration.<sup>18</sup> Sterilization was performed on 5 of the cases undergoing Caesarean section. It cannot be held that the necessity of a sterilization is an argument in favour of doing a Caesarean section, for there are other much safer methods of sterilization. Even in cases of severe decompensation, statistical evidence has shown that vaginal delivery is safer than Caesarean section.<sup>15</sup>

#### The Puerperium

The first 12-18 hours following delivery is a most dangerous time for the cardiac patient. This is borne out by the fact that 3 (26%) of the deaths in this series occurred in this period. The explanation of this is not yet clear. Treatment, therefore, is as follows:

Adequate sedation is given for the first few days. The patient must have strict bed rest for at least 14 days or until all signs of failure, if present, are gone. Grade I and II patients may be allowed up a little earlier. Breast feeding is not permitted in Grades III and IV. Careful observation is important, and a number of complications should be specially watched for. These include puerperal infections, pneumonia or atelectasis, deep-vein thrombosis and subacute bacterial endocarditis. As far as possible these should be prevented by prophylactic penicillin, breathing exercises and leg movements. Cradles may be used for the legs but pillows under the knees are prohibited.

Subacute bacterial endocarditis occurred in only 1 (0.3%) patient in the postpartum period. She made a complete recovery.

#### MATERNAL DEATHS

There were 8 (2.8%) maternal deaths in the series. The incidence reported in the literature varies from 0% to 7.8%.<sup>1,2,19,20</sup> The main data relating to these 8 cases are set out in Table VIII. An analysis of the 8 cases reveals a number of important points. In 6 of them congestive cardiac failure or pulmonary oedema was the cause of death. Haig and Gilchrist<sup>20</sup> also found these causes in 75% of the deaths in their series. Of the other 2 deaths 1 was due to rupture of an aortic aneurysm; the other followed the administration of an anaesthetic in a Grade I cardiac patient with moderate toxæmia. In the 4-year period 1953-1956, 69 maternal deaths occurred in the institutions under review. Cardiac disease therefore accounted for 11.7%. This is similar to the figures quoted by MacRae.<sup>1</sup>

Three of the 8 patients who died were non-booked cases. However, only 2 (cases 3 and 5) can be said to have received reasonable antenatal care. The other booked cases either absconded or started their attendance very late. This is unquestionable evidence of the importance of adequate antenatal care.

Finally it will be noted that, of the patients who died, all except cases 7 and 8 died or were delivered during the 28th-32nd week period. This again illustrates the need for special supervision at this time.

#### SUMMARY AND CONCLUSIONS

A review of 284 cases of heart disease in pregnancy seen in the institutions under the control of the University of Cape Town in the years 1953-1956 is given.



These 284 cases were just under 1% of all admissions.

The great importance of antenatal supervision is emphasized. This is borne out, *inter alia*, by the fact that the maternal mortality was twice as high and the foetal mortality 3 times as high in non-booked patients.

The incidence of the various types of lesions occurring in the series is considered in detail.

The management throughout pregnancy and in labour, delivery, and the puerperium is outlined. The methods of delivery are presented and emphasis is given to the place of forceps delivery and Caesarean section.

The 8 maternal deaths in this series are analysed and discussed. It is pointed out that only 2 received reasonable antenatal care and that the majority of deaths occurred about the 28th-32nd week of pregnancy.

I should like to thank Prof. J. T. Louw, Head of the Department of Obstetrics and Gynaecology, University of Cape Town, for his encouragement and advice and for permission to use the statistics. Thanks are also due to Dr. F.

Benjamin for the time and trouble he put into assistance with this paper and to Miss Suzanne du Toit for extracting data.

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## THE CROSS-ROADS

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In a Leading Article 'Behaviour of the market place' published in the *British Medical Journal*,<sup>1</sup> and a lecture on medical ethics<sup>2</sup> entitled 'Profession or business?' delivered at Harvard Medical School, by Prof. J. Howard Means, the attention of the profession is drawn to a suggestion that medicine is at the cross-roads and in danger of degenerating into a business or trade.

The fact that at some of our medical schools permission has been granted to clinical professors to engage in competitive private practice has, in my opinion, aggravated that possibility in South Africa. The example of the clinical professors of today will be the practice of future generations of practitioners tomorrow. If medical students were to gain the impression that their professors are more interested in the financial aspect of their work than in their academic duties or in maintaining the established traditions of the medical profession, a step would have been taken towards undermining the foundations of an honourable calling.

This is no new idea. In the fifth century B.C. Plato, in his *Republic*, said 'It would seem Adeimantus, that the direction in which education starts a man will determine his future life'.

The following references give an indication of the views of leading medical authorities throughout the ages. The oath of the early Hindu physicians, of whom Susruta of the 5th century B.C. was one of the greatest, stated: 'Not for self, nor for fulfilment of any early desire for gain, but solely for the good of suffering humanity should you treat your patient and so excel all'.

During the life of Hippocrates (460-357 B.C.) the same doctrines were taught. At the beginning of the 20th century, that great medical philosopher, Sir William Osler, Late Regius Professor of Medicine, Oxford, and Honorary

Professor of Medicine, Johns Hopkins University, emphasized the great influence exerted by the outstanding teachers of medicine throughout its history. In *Aequanimitas*<sup>3</sup> he remarks: 'No other profession can boast of the same unbroken continuity of methods and of ideals. We may indeed be justly proud of our apostolic succession . . . Amid all the changes and chances of 25 centuries the profession has never lacked men who have lived up to these Greek ideals. They were those of Galen and of Aretaeus, of the men of the Alexandrian and Byzantine Schools, of the best of the Arabians, of the men of the Renaissance, and they are ours today.' He goes on to say: 'The practice of medicine is an art, not a trade; a calling, not a business; a calling in which your heart will be exercised equally with your head'.

The World Medical Association, an international organization representing the national medical associations of some 60 countries and more than 750,000 individual doctors, is a group which enjoys tremendous influence with the people of the world.<sup>4</sup> It was significant to note that, when the World Medical Association came into being in 1948, its first action was not to concentrate on the demands of medical science, but to draw up a revised version of the Hippocratic Oath—the Declaration of Geneva—while in 1949 the International Code of Medical Ethics was published. The British Medical Association published a booklet in 1949: *Ethics and Members of the Medical Profession*. In this it is stated: 'On admission to the brotherhood of medicine every new member not only succeeds to the benefit of its special place in society, but also takes upon himself the duty of maintaining this high position'.

In an Editorial article<sup>5</sup> in the *South African Medical Journal* of 21 May 1960 the following appears: 'In recent

times the intensified economic struggle for existence, which has become apparent all over the world, has called disruptive forces into being. As elsewhere, these forces have threatened to undermine the status of the medical profession. It is therefore imperative that all practising doctors should do everything in their power to prevent the commercialization of a profession that has always been inspired by altruistic ideals and the principles of humanity and service. It is indeed a happy thought that in this respect the great body of the medical profession has remained as sound as ever. There have always been and there will always be those "seven thousand which have not bowed unto Baal" and who, at all times and in all circumstances, will uphold the established traditions and the honour of the medical profession\*.

There is no obligation on any medical practitioner to take up teaching as his life's work, but in view of the vast responsibilities it entails, if he elects to do so, he should be prepared to act in the spirit of the age-old traditions of the profession. Whereas a medical man is worthy of remuneration in keeping with his unique position in the community, there is no place in a vocation or calling, be it the Church or Medicine, for what may be called the Rolls-Royce mentality.

So far the ethical side of the problem has been considered. What about the academic side?

During a visit to Europe last year, I made detailed enquiries into medical educational matters. In France I learned that the de Gaulle Government, acting on the advice of the French Academy of Medicine, issued an Ordinance in December 1958 to the effect that the teaching of medicine should in future be carried out by full-time personnel, and that this would be implemented in 1961.

In Great Britain I was informed that the 17 professors of obstetrics and gynaecology are all full-time. Of these, one at least is allowed to deal with private patients, but any fees earned must be paid into a special research fund.

At Edinburgh University, my alma mater, for many generations it was the custom for clinical professors to do private practice. In the light of experience, it is now the policy of the University that they shall be full-time.

In a lecture "The scientific approach to surgery",<sup>6</sup> Sir James Patterson Ross, Professor of Surgery, University of

London, and surgeon, St. Bartholomew's Hospital, said in enumerating the outstanding qualities of Prof. William Sheen and Prof. George Gask, "Both were pioneers in the establishment of whole-time professorial clinical units . . . and showed that they possessed more foresight than the majority of their contemporaries".

This opinion is apparently shared in one of the South African medical schools where, at a special meeting recently called to discuss the problem, a large majority of the full-time clinical teachers expressed an 'overwhelming feeling against private practice for full-time staff'. The part-time clinical lecturers at the same institution were unanimous in arriving at a similar opinion.

There is thus weighty evidence of a wide-spread belief among medical educationists, not only abroad but also locally, that, where the head of a clinical department is concerned, all his time should be concentrated on teaching, administration, and research. In the past one or other of these aspects was known to suffer owing to the inevitable demands made by the public for the attention of a clinical professor. Anyone who has carried on a successful practice knows only too well how difficult it is to limit the amount of work which he is called upon to undertake. In view of the revolutionary advances that have been made in medical science in recent times, it is well-nigh impossible for an individual to keep abreast of these, while doing justice to his duties as the head of a clinical unit and at the same time coping with private practice.

As a result of long experience gained while on the staffs of teaching hospitals in Great Britain, America, and South Africa, and 17 years as a member of the Medical Education Committee of the South African Medical and Dental Council—the body that controls medical education in this country—I have formed the opinion that, unless those who resolve to take up a career as teachers of medicine are impelled initially by a sense of high vocation and are prepared to dedicate their lives to this work, medical education in this country will suffer. No man can serve two masters.

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### THE TREATMENT OF SHARK ATTACK\*

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Among the more terrible emergencies that a doctor may have to face are those which arise from shark attacks on humans. Few tropical or sub-tropical seas are wholly immune from such incidents, which assume an importance out of all proportion to their mortality significance—mostly because of the story-book fierceness of sharks, and from pictures of their teeth and jaws, which, once seen, are not soon forgotten. In the last 20 years there have been 40 such attacks off the Natal coast, of which 16 have been fatal. In spite of the fact that 20 people are killed on the roads of this country almost weekly, one single shark attack on the Natal coast is enough

\* This paper was presented in a shortened form at the National Congress of Artificial Respiration and Asphyxia, held at the University of Natal Medical School, Durban, December 1960.

to empty every hotel within miles. Tourists stream back home on the roads, where they face an astronomically greater risk of being hurt than if they were to bathe daily for years in the most 'dangerous' surf.

Recent research carried out at the Oceanographic Research Institute in Durban, with the able help and collaboration of the Director, Prof. David Davies, in conjunction with observations made during the 1957-1958 'rash' of shark attacks and close examination of the 1960 victim, has shown that the medical attitude towards the treatment of these patients has changed, this change has occurred firstly because of the more efficient beach resuscitation of victims, and secondly because of the newer and more powerful antibiotics. For the most

comprehensive work on the aetiology and incidence of shark attacks reference may be made to Dr. V. M. Coppleson's monograph *Shark Attack*.<sup>1</sup> This author is regarded, by general consent, as the world authority on the subject; his work was written more for scientists and laymen than for doctors, and because of this, he has made no reference to treatment. This paper is written to fill the gap.

#### The Aetiology of Shark Attacks

Since Dr. Coppleson's book is readily available for reference, it would perhaps be superfluous to enter into a discussion about the aetiology of these attacks, except to make certain superficial comments. Sharks can quite accurately be described as organisms that are rarely, and cyclically, pathogenic to man, and are rendered more virulent by certain circumstances. It is well documented that sharks attack people at certain times of the year, generally when the temperature of the water is over 70°F., and that these attacks often coincide with a shortage of the shark's natural food. To sharks, in contradistinction to more arduously-won food, the bathing human must represent a very succulent and easily-acquired morsel. When one realizes the density of sharks near most bathing beaches, it is surprising that such attacks are not more common. Fortunately, the shark is a far more timid creature than the story books will allow!

Sharks will sometimes bite in terror or desperation, or in pique. A marine biologist colleague was relieved of his right breast and most of his pectoralis major muscle by a shark which, enclosed by a seine net, had tried several times to escape; in apparent terror it turned and rushed with vicious intent at this colleague who was standing shoulder-deep at the mouth of the net. The technician-diver who, in an aqualung, feeds the fish at the Durban Oceanarium to entertain the crowds, was recently bitten quite severely on the thigh by a 3-foot shark who apparently felt neglected in the 'hand-out'. It is difficult to group these two instances with the determined 1958 Scottburgh attack, where a large shark rushed among a number of people in 3 feet of water, to inflict, in 3 onslaughts, ghastly and almost immediately fatal injuries on a man who had merely entered the edge of a crystal-clear surf to wash the sand from his legs.<sup>2</sup>

#### Sharks Responsible for the Attacks

Many species of sharks have been incriminated in shark attacks all over the world. They vary, not only according to locality, but also according to the type of beach and the depth of water in which people may be swimming at a particular place. In Durban, for instance, the South Pier, which stands in 40 feet of water, is a veritable Mecca for shark anglers — no less than 17 large man-eating sharks have been landed on rod and line on a single afternoon. There the large grey and tiger sharks are seen and taken — probably because of the fact that the whaling ships coming from the South Coast steer very close to the pier towing their catches, which shed gallons of blood. Not more than 2 miles from here are the premier bathing beaches of the country — Durban South and North beaches. These areas are guarded by nets, which have cut the number of attacks on those beaches to nil, since we had the good sense to follow the example of the Australians in this respect. In these nets, the very large sharks seen at the South Pier are not caught in any great numbers, possibly because the water is shallower, and possibly because the whalers do not approach the port as commonly from the north. In fact the hotels at Umhlanga Rocks, 10 miles to the north, openly advertise their beaches as 'shark-free', simply on the grounds that an attack has never occurred there, whereas only 5 miles to the south there have been several attacks.

From the point of view of the clinician, sharks are divided into 2 classes: (a) those which bite cleanly, such as the grey sharks (*Carcharinus* Spp. in Natal), and (b) those which leave a very jagged and dirty bite, such as the ragged-toothed shark (*Carcharias taurus* Rafinesque) which bites with the accent more on tearing than on cutting, as the clinical description of the 1960 Natal coast attack shows.<sup>3</sup> In spite of their untidy bites, these ragged-toothed sharks can do an enormous amount of bony damage, as was seen in the 1960 attack mentioned above, and in the 1958 Scottburgh attack.<sup>4</sup>

#### THE CHANGING FACE OF TREATMENT OF SHARK ATTACK

Judging by previous reports, the treatment of shark attack in the past has been to tie tourniquets on the patient, wrap him up warmly, bundle him into the nearest car, and rush him to hospital. There radical surgery was invariably performed, mainly to offset the possibility of serious infection. The words 'the victim was rushed to hospital, but died soon after admission' occur so frequently in Dr. Coppleson's records,<sup>1</sup> that one is forced to the conclusion that the 'rushing' contributed materially to the fatal outcome in these cases.

By the time the shark victim has reached the beach, he is generally exhausted and shocked by the double exertion of struggling with the shark, and the extra efforts that a crippled person has to make to swim through the surf to the beach. Such a patient would fare far better if he spent 30 or even 60 minutes lying quietly (whether sedated or not) in the 'head-down' position on the slope of the beach, and slightly chilled — rather than being carried bodily to a waiting car in which he sits propped up, smothered in coats and other materials in a warm atmosphere, having to undergo what is often a very rough ride to the main road, upon which he faces the prospect of a hectic ride to the nearest hospital. It is small wonder that such patients arrive at the hospital in irreversible shock. A far better plan is to rush plasma or blood to the patient, and he should be left lying on the beach near where he was attacked, though out of reach of the waves; if tourniquets are properly applied, then not much further harm can come to him if he is kept still, cold, and in the head-down position.

Surf bathers are generally very fit people, and if allowed a short while to bring their acute anti-stress mechanisms into play, will apparently make dramatic recoveries. This point is borne out by the description of the 1960 Natal South Coast attack,<sup>5</sup> where a young, fit victim arrived on the shore without aid, with 'two-thirds of his small bowel' outside a rent in his abdominal wall, the right kidney actually being exposed; in addition he had severe lacerations on his right arm and his right leg, and finger injuries on his left hand. Fortunately he was seen soon after by a doctor, who sedated him with morphine, even though he was free of pain, and kept him in the head-down position for about 30 minutes, checking his blood pressure and pulse. Only after this time, when the doctor was satisfied with his improvement, did he allow the patient to be moved to hospital; note that in this case no intravenous therapy was available. There is no other recorded instance of survival from a major abdominal wound in shark bite, and in my opinion it was the doctor's treatment on the beach that paved the way to this boy's remarkable recovery — not that I wish to belittle the magnificent major surgery that was performed upon him in hospital, which turned what was virtually a pathological specimen into a fit and vigorous young man.

Two main factors have caused a change of approach to the victims of shark attack: firstly, the fact that it is now possible to provide powerful anti-shock measures for the patient on the beach, without moving him, and secondly, the effect of the newer and more effective antibiotics on the infective factor, which has always haunted surgeons in the past.

#### Adjuvant Resuscitative Measures on the Beach

The use of the 'Feinberg pack'. Probably because of the proximity of his consulting rooms to a beach that has been the site of several attacks, pride of place in beach resuscitation after shark attack must go to Dr. S. Feinberg of South Coast, Natal. He has evolved a 'pack' for emergency use, which contains the following:<sup>6</sup> 1 vacoliter of normal saline; 1 bottle of dried human plasma; 1 bottle of plasma diluent; 2 plastic intravenous giving sets; ampoules of morphine, coramine and 'levehed'; syringe, swabs, spirit and tourniquets. A doctor can keep this pack, which is known as the Oceanographic Research Institute in Durban as the 'Feinberg pack', separately from his bag in the back of his car; another can be kept in his rooms, if they are near a 'bad' beach. Since the pack contains what is required for emergency resuscitation only, it is wise for the doctor to send someone for his bag, and at the same time ask the nearest hospital to send some more plasma and diluent, or group O blood. The use of the pack is described later.



*The use of Minnett's apparatus.* The 'minute man', as Minnett's apparatus is familiarly known among life savers, is now available on the more populous Natal beaches, for use in resuscitation of the apparently drowned. It is generally kept in the life saver's hut, and is valuable for the administration of oxygen, and for its use as a suction apparatus. Its principal application in the treatment of shark attacks would be as an adjuvant to Feinberg's pack. It can be carried for long distances quite easily. Any beach that has Feinberg's pack and a Minnett's apparatus in its life saver's hut, is well equipped for the emergency treatment of shark attacks.

#### *The Infective Factor and the Newer Antibiotics*

Studies carried out by the Oceanographic Research Institute in Durban in 1959 and 1960,<sup>2</sup> have shown that an unusual germ can frequently be isolated from the teeth of living sharks.

This is a paracolon bacillus, which has such powerful haemolytic properties that it is able to clear a whole 'blood plate' on subculture after 24 hours. It is, however, sensitive to most of the newer antibiotics (especially 'terramycin', chloramphenicol and 'aureomycin'), though it is resistant to the sulphonamides and penicillin. Its fermentation properties are described in detail elsewhere.<sup>3</sup> This same organism, with an identical antibiotic-sensitivity spectrum, was isolated from the wounds of the victim of the 1960 attack. As mentioned earlier, this was the first recorded case of recovery from a major abdominal injury due to shark attack; in this case, the ileum was cut from the caecum,<sup>4</sup> and the caecum was punctured, together with parts of the small bowel. The antibiotic, which was instrumental in keeping this gross infection at bay, was intravenous terramycin. Chloramphenicol was used very successfully in 2 of the Port Shepstone cases,<sup>4</sup> in one of whom there were very extensive superficial lacerations as well as the loss of an arm; incidentally this was the first case in which Feinberg's pack was used with success. Though we have not, as reported in Australia, encountered tetanus or gas gangrene,<sup>5</sup> we believe that it would be wise to incorporate the use of their antisera in treatment in view of the fact that the Natal surf is frequently contaminated by mud from many rivers.

In the light of the above remarks, it would appear that one of the serious factors complicating shark wounds in the past— infection—has not nearly the significance that it had before, and this, coupled with the powerful anti-shock measures that can be implemented on the beach, has laid the emphasis upon conservative surgery and thorough early resuscitation. Any patient who is properly revived on the beach, and who reaches hospital, will almost certainly survive. Apparently it does not take long for the acute stress mechanisms of the healthy surf swimmer to come into effect, *provided they are given the chance.*

#### *Preparations Which Should be Made in 'Shark Areas'*

It goes without saying that those doctors who are prepared to treat shark victims can render valuable service. 'He gives twice who gives quickly' was never truer of any emergency than of shark bite. The following measures are recommended:

1. Ensure that Feinberg's pack and Minnett's apparatus are available near 'bad' beaches, and that all doctors know where they are available.
2. Doctors near shark beaches should have some sort of rota, so that the telephone exchange knows who is available and where he can be found.
3. Ensure that local hospitals have reserve supplies of dried human plasma; most Natal coastal hospitals have both plasma and group O blood.
4. The public should be urged to bathe only on netted beaches, and should scrupulously observe the instructions of life savers.

#### CLINICAL FEATURES OF SHARK ATTACKS AND LINES OF TREATMENT

##### 1. In the Water

Help the patient ashore. This is of necessity carried out by lay people or life savers. Try to chase the shark away. Frequently the shark will make more than one attack. A very gallant person was decorated for 'rugby-tackling' a shark after

one of the South Coast attacks, since it persisted in its attacks upon a young girl.

##### 2. On the Beach

###### *Clinical Features*

- (a) To what extent is the patient shocked? Has he lost a lot of blood?
- (b) Has the wound penetrated the abdominal cavity?
- (c) Is there gross contamination of the wound?

###### *Treatment*

Move the patient no further up the beach than is necessitated by wave action, and place him in the 'head-down' position on the slope of the beach. Apply tourniquets immediately. Lay people should restrain their natural urge to do anything more than this, and should call a doctor at once.

Give no warm drinks or alcohol, and cover the patient with a light wrap. Sips of fresh water may be given. Attempt no other local measures apart from stopping bleeding and covering the wounds with a towel.

The doctor should use Feinberg's pack at once. The bottle of saline must be set up as soon as possible. While this is running into a vein, the plasma should be reconstituted; when ready it can be substituted immediately. Send for more plasma, and for blood.

Give morphine, 1-3 gr., whether pain is present or not. Record the blood pressure and pulse frequently.

Use Minnett's apparatus, levoephed or coramine if the patient is severely collapsed. *Severe shock should be a contra-indication to moving the patient from the beach.*

Lay people should not attempt to move the patient without medical supervision.

When the patient is ready to move, that is, *when significant improvement is demonstrable*, forewarn the hospital. Do not move to any centre that it not fully competent to carry on with further intravenous therapy.

Record the pulse and blood pressure as the patient leaves the beach, together with a note of the drugs given, and give this record to the driver of the ambulance or car. He should drive slowly.

Note for the benefit of the surgeon whether the wound is very jagged and whether it appears to have involved the abdominal cavity or not. Note whether there was any sewage or other contaminant in the sea at the time of the attack.

Do not remove the needle from the vein even if the drip is finished, since the surgeon may be very grateful for its presence. If possible, maintain a slow drip on the way to hospital.

##### 3. At the Out-patient Department

Since the hospital has been forewarned, group O blood and plasma should be available for immediate administration. Blood samples should be taken for routine and emergency compatibility, and for haemoglobin estimation.

The blood pressure and pulse should be checked against the beach readings.

##### 4. In the Surgical Ward

###### *Clinical Features*

- (a) Just how much has been achieved by emergency resuscitation?
- (b) Will it be possible to leave the patient in the ward for some hours before operating, so that his shock can be satisfactorily countered?

###### *Treatment*

As soon as the patient is admitted, give large doses of terramycin, chloramphenicol or aureomycin parenterally.

Give gas gangrene and tetanus antisera.

Do not remove dressings in the ward, unless wounds are minor, or unless it is decided to delay operating.

Delay operating as long as possible.

##### 5. In the Theatre

###### *Clinical Features*

- (a) Is resuscitation really complete?
- (b) What is the extent of wound contamination?
- (c) Record carefully the following features:
  - (i) The diameter of the sweep of the jaws from the wounds.

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- (ii) Are there any bony defects present?
- (iii) What are the characteristics of the skin punctures?
- (iv) Are the cut skin edges clean-cut or jagged?
- (v) Are there 2 discrete rows of teeth marks visible in 'tentative' bites? Record the distance between the rows.
- (vi) What is the distance between the lesions made by adjacent teeth in the front row?
- (vii) Are there any lesions that might have been made by 'bumps' from the shark? (That is to say lesions not caused by its teeth.)

(d) Make careful photographic records of all wounds.

#### Treatment

Be ultra-conservative in all surgical measures. Remove dressings after induction, and swab all lesions with sterile throat swabs, which should be inserted deeply into all 'stiletto' lesions. These should be 'plated out' at once for organism sensitivity.

Having made careful measurements of the wounds as stated above, smear any visible bony defects with sterile BIPP (bismuth, iodoform and paraffin paste), to facilitate subsequent X-ray examination.

Debride only obviously necrotic tissue, and do not attempt to remove all the tissue involved. If the blood supply is intact, even the most infected and lacerated limb can possibly be saved with a return of function.

Do not attempt tendon suture unless the wound is very clean.

If bowel is involved, resect widely and exteriorize.

Do early skin grafting wherever possible, to preserve nerves, tendons, vessels, joints and even muscles and to reduce the postoperative 'illness of trauma'.

#### 6. Postoperative Care

These measures will be governed by the usual surgical principles. In such healthy patients, the surgeon can expect a very clean field in a short time, with the combination of healthy tissues and powerful antibiotics. It is wise to ensure that the antibiotic used is the one shown to be the best by sensitivity tests. Intravenous therapy should be prolonged only as long as is necessary, and intensive physiotherapy should be instituted as soon as possible.

#### PREVENTIVE MEASURES

Even with the most modern and effective methods of treatment, we can still expect a mortality of about 25% of shark-bite victims. The chief remedy is in prevention, and this is really outside the realm of the doctor. It would appear impossible to prevent people bathing on un-netted beaches, since there are few resorts which can afford these costly barriers. In addition to shunning such beaches, bathers should avoid bathing in muddy water of whatever depth, and they should not wear brightly coloured bathing suits; they should

take off all ornaments that reflect the light, but above all should always heed the directions of the life savers. As long as bathers neglect these few simple rules, then doctors and scientists can say with confidence that they will have ample opportunity of studying further cases of shark attack. Probably the greatest factor determining whether the patients will survive or not is whether they get the right emergency treatment; possibly the greatest task of the life saver or ambulance worker on the spot will be to protect the victim from members of the public, who can seldom restrain their desire to 'do something' for seriously injured people.

#### SUMMARY

Three main points underly the modern treatment of shark attack victims:

1. Leave the patient lying flat in the head-down position on the beach, just out of reach of the waves. Lay people should restrain their overwhelming urge to 'do something' for such patients. This is probably the most important factor determining survival.

2. Carry out thorough beach resuscitation. Rush the plasma to the patient, and not the patient to the plasma.

3. Rely on the power of the newer antibiotics. These have reduced the need for radical and emergency surgery.

#### ADDENDUM

Since this paper was submitted, 2 young patients who were savagely attacked on the Natal South Coast, and who lost large amounts of blood, would appear to have derived benefit from the 'treat them on the beaches' regime.

Unfortunately the victim of the Christmas Eve lower Natal coast attack was so determinedly injured by an enormous shark that both his legs were cleanly severed in 2 bites (one at the level of the lesser trochanter, and the other at the knee joint) in a few seconds. Needless to say the patient expired before reaching the beach.

Fragments of teeth in the body of this last patient identified the shark as a shovel-nosed grey (*Carcharinus* Sp.), weighing about 1,000 lb.

I should like to thank Prof. D. H. Davies of the Oceanographic Research Institute in Durban for his cooperation, help, encouragement and criticism. Mr. E. Barker, F.R.C.S., kindly read and amended the manuscript.

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## WORLD LIST OF FUTURE INTERNATIONAL MEETINGS

### ALTERATIONS AND ADDITIONS NOTIFIED DURING JANUARY 1961

*Ciba Foundation Symposium on Clinico-pathological Significance of Renal Biopsy*, London, 14-16 March 1961. Ciba Foundation, 41 Portland Place, London, W.1 (by invitation).

*Ciba Foundation Symposium on the Role of Enzymes in the Mechanism of Drug Action*, London, 22-23 March 1961. Ciba Foundation, 41 Portland Place, London, W.1 (by invitation).

*United Nations, Scientific Committee on Effects of Atomic Radiation*, 9th session, Geneva, March 1961. United Nations, New York.

*Congress of Biological Medicine*, Berlin, 27-30 April 1961. Dr. W. Massmann, Rubenstrasse 125, Berlin-Friedenau, Germany.

*International Association for Bronchology*, 11th Congress,

Rome, 25-28 May 1961. Prof. Giusto Fegiz, General Secretary, Associazione Studi Bronchiali, Ospedale Sanatoriale C. Forlanini, Rome, Italy.

*Ciba Foundation Symposium on Normal and Abnormal Functions of the Endocrine Pancreas*, London, 30 May-1 June 1961. Ciba Foundation, 41 Portland Place, London, W.1 (by invitation).

*Twelfth International Hospital Congress*, Venice, 5-9 June 1961. Dr. J. C. J. Burkens, Secretary General, International Hospital Federation, 24-26 London Bridge Street, London, E.C.2.

*Ciba Foundation Symposium on Tumour Viruses of Murine Origin*, Perugia, Italy, 21-23 June 1961. Ciba Foundation, 41 Portland Place, London, W.1 (by invitation).

## From the Secretary's Desk

### 43rd South African Medical Congress

As is now well known, the 43rd South African Medical Congress will be held in Cape Town from 24 to 30 September. The two Plenary Sessions will deal with 'Diabetes' and 'The care of the aged'. It is interesting to note in regard to the choice of the latter subject that at the 14th General Assembly of the World Medical Association which was held in West Berlin last September the following resolution was carried:

'WHEREAS, by virtue of the great strides in the medical arts and sciences during the last 20 years, the span of life and life expectancy have been advanced by as much as 10 or more years, which has resulted in an increase of the aged in the population; and

'WHEREAS, this increase in the aged population creates various socio-medical problems;

'THEREFORE BE IT RESOLVED by the XIVth General Assembly of The World Medical Association that the efforts of the national medical associations and other organizations in providing adequate medical care and solving the socio-economic problems associated with the increase of the aged in the population be approved and encouraged in conformity with the national needs and the recognized social system of each country.'

### Medical Insurance

Early in February you will receive a circular from Dr. Marchand, the Associate Secretary, in connection with the South African Mutual Medical Aid Society, and it would be appreciated if this circular could be carefully noted. A slip will be attached which you will be asked to complete.

There is a point which should be remembered in this connection, and it is that although the South African Mutual Medical Aid Society for the public is not approved, the South African Mutual Staff Medical Aid Society continues to be an approved medical aid society.

### Benevolent Fund

Recently the Management Committee of the Benevolent

Fund gave attention to the renewing of grants for the current year. The needs of the beneficiaries obviously increase as the cost of commodities rises, and the Committee discussed the possibility of more money being raised for the Fund in the Branches. The suggestion was made that Committees be formed in the various Branches to deal with Benevolent Fund affairs, and a memorandum on this subject is being prepared. You will hear more of this matter in the near future.

### Car Badges

When the receipts for membership dues are sent out this year, members will receive a plastic car sticker badge in place of the cardboard disc which was formerly provided. The form of the badge has been altered to some extent and it is very much clearer in design than formerly. We have to thank Messrs. Westdene Products (Pty.) Ltd. for their co-operation in preparing these badges.

### Commonwealth Medical Conference

When this letter appears in the *Journal* I shall be in Auckland attending the Commonwealth Medical Conference on your behalf. The Conference will be followed by the Annual Meeting of the British Medical Association which is being held this year in Auckland, and I shall represent our Association as its official delegate. Naturally, reports of these meetings will be written and will appear in the *Journal* in due course. I expect to return to office on 20 February, and during my absence Dr. Marchand at the Pretoria office will deputize for me.

Medical House  
Cape Town  
20 January 1961



## UNIVERSITEITSNUUS : UNIVERSITY NEWS

### UNIVERSITY OF THE WITWATERSRAND

Graduates of the Medical School and members of the Medical Graduates Association of the University of the Witwatersrand have contributed monies to form the Medical Graduates Association Alumni Bursary with the intention of assisting needy dependants of medical graduates to further their studies at university. The By-laws governing the award are reproduced below to inform those interested of the availability of the bursary:

#### BY-LAWS GOVERNING THE AWARD OF THE MEDICAL GRADUATES ASSOCIATION ALUMNI BURSARY

The Alumni Bursary Fund of the Medical Graduates Association shall be founded with the monies donated by the alumni together with such funds as may have been donated by the Council of the Medical Graduates Association for the purpose of establishing a bursary.

The Fund may receive donations from persons or organizations to further the object of the Fund.

#### Object of the Fund

To establish bursaries to be allotted as hereinafter prescribed.

#### Conditions of Award of Bursary

1. A primary consideration for the award of the bursary shall be the financial need of the applicant.

2. The value of the bursary shall be determined by the Council of the Medical Graduates Association and shall in no instance exceed the interest which has accrued to the Fund up to the time of allotment.

3. The bursary shall be made available for any 1 year of undergraduate study, but the holder of the bursary shall be eligible to re-apply for the bursary each year.

4. Re-award of a bursary shall be made only on satisfactory progress and achievement.

#### Eligibility

1. The bursary shall be awarded in the first instance to a dependent of a University of the Witwatersrand medical graduate for the purpose of the study of medicine at the University of the Witwatersrand.

2. Failing a suitable applicant as defined in (1) above the bursary may be awarded to the dependent of a medical graduate of the University of the Witwatersrand for the purpose of study in any other faculty at the University of the Witwatersrand.

3. Failing a suitable applicant as defined in (1) and (2) consideration may be given to a dependent of a medical graduate of the University of the Witwatersrand who wishes to undertake undergraduate study, in any faculty, at any recognized university in South Africa.

4. The Council of the Medical Graduates Association shall reserve the right not to make an award if in its opinion no suitable application has been received.

#### Applications for Bursary

Application for the bursary shall be made to the Registrar of the University of the Witwatersrand not later than 31 December each year.

The Registrar of the University shall recommend such applicants as may be considered eligible for the bursary for the consideration of the Council or Sub-Committee of the Medical Graduates Association who shall make the final selection of the bursar for the year.

## AMPTELIKE AANKONDIGING : OFFICIAL ANNOUNCEMENT

SUID-AFRIKAANSE ONDERLINGE MEDIESE  
HULPVERENIGING

Na aanleiding van die aankondiging wat in die *Tydskrif* van 14 Januarie 1961 verskyn het, word die aandag van lede van die Vereniging weer daarop gevestig dat onderhandelings met die Suid-Afrikaanse Onderlinge Mediese Hulpvereniging gestaak is en dat die goedkeuring toegesê aan sekere groepe, wat deur die hulp-vereniging beheer is, terugtrek is.

Dit is die beleid van die Vereniging om die stelsel van mediese hulp uit te brei deur die stigting van mediese hulpverenigings aan te moedig. Toe die versekeringsmaatskappye die Vereniging genader het om hulp by wyse van 'n voorkeurtarief, het die Vereniging gevoel dat dit nie van die beginsels, wat aanvaar is in verband met die erkenning van mediese hulpverenigings, afstand kon doen nie. Die Vereniging was egter bereid om die versekeringsmaatskappye te help insoverre dat as hul groepe van persone sou vorm wat aan die reëls van mediese hulpverenigings voldoen, die voorkeurtarief op hierdie groepe toegepas sou word. Onderhandelings het plaasgevind om die maatskappye te help om hul polisse in lyn te bring met die vereistes van die Vereniging en om te verseker dat net diégene vir wie die tarief oorspronklik bedoel was, in hierdie groepe ingesluit sou word.

Onderhandelings het tot dié mate geslaag dat sekere groepe, wat deur SANSOM en die Suid-Afrikaanse Onderlinge Mediese Hulpvereniging verseker is, deur die Federale Raadvergadering in Oktober 1960 erken is. Op die vergadering het die Federale Raad egter, ingevolge voorstelle deur die versekeringsmaatskappye ingedien, ingestem om die bepaling, i.v.m. die inkomste van lede van mediese hulpverenigings, te wysig. Alhoewel werkgeroosterde verenigings nog aan die vereiste van 'n gemiddelde inkomstestelsel moet voldoen, sal persone met 'n inkomste onder 'n perk as mediese hulp-pasiënte beskou word.

Intussen het die Suid-Afrikaanse Onderlinge Mediese Hulpvereniging egter 'n nuwe skema begin wat vir die Vereniging as gevolg van die drastiese besnoeiing van die voordele geheel en al onaanneemlik was. Die Vereniging is van mening dat hierdie skema nie die bevredigende diens aan sy lede lewer wat van 'n mediese hulpvereniging verwag word nie. Aansoek om goedkeuring van hierdie skema was derhalwe nie toegestaan nie. Die Vereniging is egter in kennis gestel dat dit die doel van die Hulpvereniging was om alle persone in die reeds goedgekeurde groepe so spoedig moontlik na hierdie onaanneemlike skema oor te plaas. Dit tesaam met die voorname van die Hulpvereniging om voort te gaan met die uitreiking van gekodifiseerde tjeks aan mediese praktisyns—waarteen die Vereniging beswaar aangeteken het—het die Vereniging laat besluit om alle onderhandelings met die Hulpvereniging te onderbreek.

Verdere verduideliking sal in 'n volgende artikel gegee word. Lede van die Vereniging moet hul pasiënte wat lede van die Suid-Afrikaanse Onderlinge Mediese Hulpvereniging is, in kennis stel dat hul as gewone private pasiënte behandel word en dat doktersgelde direk deur hul betaalbaar is en dat hul self hul eie reëlings i.v.m. indenniteit met die Hulpvereniging tref. Praktisyns behoort ook die Hulpvereniging in kennis te stel dat hul nie tjeks direk van die Hulpvereniging wil ontvang nie maar wel vereffening deur hul pasiënte self.

Plazagebou 28 - 31  
Banklaan  
Pretoria  
25 Januarie 1961

L. M. Marchand  
Medesekretaris

SOUTH AFRICAN MUTUAL MEDICAL AID  
SOCIETY

Following on the announcement which appeared in the *Journal* of 14 January 1961, members of the Association are again reminded that negotiations with the South African Mutual Medical Aid Society have been broken off and the approval which had been granted to certain groups administered by the Society has been withdrawn.

The policy of the Association is to extend the medical aid system by encouraging the establishment of medical aid societies. When the insurance companies approached the Association for assistance in the form of the preferential tariff, the Association felt it could not depart from the accepted principles governing the recognition of medical aid societies. The Association was, however, prepared to assist the insurance companies to the extent that, if they formed groups of persons which could comply with the rules for medical aid societies, the preferential tariff would be granted to those groups. Negotiations took place in order to assist the companies in bringing their policies into line with the requirements of the Association and to ensure that only the persons for whom the tariff was originally established would be included in those groups.

The negotiations were successful to the extent that certain groups insured by SANSOM and the South African Mutual Medical Aid Society were approved at the meeting of Federal Council held in October 1960. At that meeting, however, as a result of representations from the insurance companies, the Federal Council agreed to amend the rule regarding the income of members of medical aid societies. While employer-sponsored societies would still comply with an average income figure, insured persons who were in receipt of an income below a ceiling would be regarded as medical aid patients.

In the meantime, however, the South African Mutual Medical Aid Society had established a new scheme which was totally unacceptable to the Association on account of the severe restrictions on benefits. According to the views of the Association the scheme did not provide a satisfactory service to its members as a medical aid society should. Application for approval of this scheme was consequently turned down. The Association was informed, however, that it was the intention of the Society to transfer all persons in the already approved groups into this unacceptable scheme at the earliest opportunity. Coupled with the intention of the Society to continue issuing the 'coded cheques' to medical practitioners (to which the Association objected), the Association resolved to terminate all negotiations with the Society.

Further explanation will be given in a following article. Members of the Association should inform their patients who are members of the South African Mutual Medical Aid Society that they will be treated as ordinary private patients from whom fees will be claimed and that they must make their own arrangements with the Society in regard to indemnity. The Society should also be informed by practitioners that they do not wish to accept cheques direct from the Society, but will look to their patients for settlement.

L. M. Marchand  
Associate Secretary

28 - 31 Plaza Building  
Bank Lane  
Pretoria  
25 January 1961

## IN DIE VERBYGAAN : PASSING EVENTS

*Edenvale Hospital, Johannesburg.* The next clinical meeting will be held on Wednesday 15 February at 8.15 p.m. Dr. B. Epstein will speak on the present status of cerebral palsy as seen on a visit to the USA and will show a film entitled 'New legs' which was honourably mentioned at the 8th World

Congress of the International Society for the Welfare of Cripples in New York. Mr. I. Norwich will speak on 'Experience in cancer therapy at the Westminster Hospital, London'. All who are interested are invited to attend this meeting.

*South African Institute for Medical Research, Johannesburg, Staff Scientific Meeting.* The next meeting will be held on Monday 13 February at 5.10 p.m. in the Institute Lecture Theatre. Dr. B. T. Bernstein will speak on 'Enzymes in clinical medicine'.

*Dr. Peter Horrigan, M.B., Ch.B., M.Med., (Anaesth.) (Cape Town),* has commenced practice as a specialist anaesthetist in partnership with Drs. Cecil Moss and Basil Solomon at 612 Medical Centre, Heerengracht, Cape Town. Telephone: Rooms 2-1528, residence 69-3188, if no reply 69-2924.

*Dr. Peter Horrigan, M.B., Ch.B., M.Med. (Anes.) (Kaapstad),* het begin praktiseer as 'n spesialis-narkotiseuse in vennootskap met drs. Cecil Moss en Basil Solomon te Mediese Sentrum 612, Heerengracht, Kaapstad. Telefoon: Spreekkamer 2-1528, woning 69-3188, indien geen antwoord 69-2924.

*Professor H. Grant-Whyte.* The Council of the University of Natal has recently conferred a professorship on Dr. H. Grant-Whyte of Durban. Professor Grant-Whyte is Head of the Sub-Department of Anaesthetics of the University of Natal at the King Edward VIII Hospital, and is also Head of the Department of Anaesthesia at the Addington Hospital.

*Commonwealth Medical Advisory Bureau, London.* The Medical Director of the Commonwealth Medical Advisory Bureau has kindly supplied the *Journal* with a copy of the revised (December 1960) edition of the *Summary of Regulations for Postgraduate Diplomas and of Courses of Instruction in Postgraduate Medicine*, which his Bureau issues. Copies of this publication are also available at the medical schools of South African universities. The present issue of the *Summary of Regulations* contains chapters on anaesthetics, bacteriology, basic medical sciences, cardiology, chest diseases, child health, dermatology, ENT, entomology, environmental control, gynaecology, hospital appointments, industrial health, isotopes, laryngology, locums, medical administration, medical defence, medical registration, medical statistics, medicine, nuclear medicine, neurology, obstetrics, occupational health, ophthalmology, orthopaedic surgery, otology, paediatrics, parasitology, pathology, physical medicine, psychiatry, public health, radiation hazards, radiodiagnosis, radiotherapy, surgery, tropical medicine and hygiene, tuberculosis, urology, and venereology. The Bureau will assist doctors in finding accommodation, supply information about customs, entertainment, etc., provide

information about locums and registration, and medical defence. Information may be obtained from Dr. R. A. Pallister, O.B.E., M.D., M.R.C.P., D.T.M. & H., Medical Director, Commonwealth Medical Advisory Bureau, BMA House, Tavistock Square, London, W.C.1.

*The Nutrition Society of Great Britain.* A Symposium on 'The place of food science and technology in the campaign against malnutrition' will be held at the London School of Hygiene and Tropical Medicine, London, W.C.1, on Saturday 18 March 1961, under the chairmanship of Dr. W. R. Aykroyd. Doctors intending to be in Britain at that time and who are interested in attending this symposium may obtain further information from Miss D. F. Hollingsworth, Hon. Programmes Secretary, c/o Ministry of Agriculture, Fisheries and Food, Great Westminster House, Horseferry Road, London, S.W.1.

*Dr. Wynne Rigal, M.B., Ch.B. (Cape Town),* who is working as a clinical and research assistant at the Nuffield Orthopaedic Centre and Radcliffe Infirmary, Oxford, recently presented a paper entitled 'Tritiated thymidine in chondrogenesis' at a symposium on 'Radio-isotopes and bone' held in Princeton, New Jersey, USA, under the auspices of the Council for International Organizations of Medical Sciences. Dr. Rigal was awarded a Rhodes Scholarship in 1956.

*Dr. Raymond Levy, M.B., B.Ch. (Rand), D.O. (R.C.P., Lond., R.C.S., Eng.),* has recently returned from overseas and joined Dr. I. B. Taylor in practice as an ophthalmologist at 216 Harley Chambers, Jeppe Street, Johannesburg. Telephone: 23-6622.

*Dr. Raymond Levy, M.B., B.Ch. (Rand), D.O. (R.C.P., Lond., R.C.S., Eng.),* het onlangs uit die buiteland teruggekeer en praktiseer nou saam met dr. I. B. Taylor as 'n oogarts te Harley-gebou 216, Jeppestraat, Johannesburg. Telefoon: 23-6622.

*Professor H. L. Wallace.* The Council of the University of Natal has recently conferred a professorship on Dr. H. L. Wallace of Durban. Professor Wallace is Head of the Sub-Department of Paediatrics of the University of Natal at the King Edward VIII Hospital, and is also Senior Physician at the Addington Children's Hospital, Durban.

## NUWE PREPARATE EN TOESTELLE : NEW PREPARATIONS AND APPLIANCES

### PHENOBARBITONE RECTIOLE

Newport Trading Corporation (Pty.) Ltd. announce the introduction of Phenobarbitone Rectiole, manufactured by Dr. Mann Laboratories, and supply the following information:

Phenobarbitone Rectiole contains 1½ gr. of phenobarbitone in a genuine solution for rectal instillation in cases of vomiting, convulsions, for premedication, etc. It is very rapidly absorbed owing to instillation into the lower section of the rectum and absorption through the vena cava system, avoiding the portal vein system. Phenobarbitone Rectiole may be administered as required.

Further information may be obtained from Newport Trading Corporation (Pty.) Ltd., P.O. Box 1871, Johannesburg.

### SECERGAN

Astra, Sweden, announce the introduction of Secergan, a new type of drug with anticholinergic and ganglion-blocking actions, and supply the following information:

Secergan is 10-( $\alpha$ -dimethylaminopropionyl)-phenothiazine. It reduces the acidity of gastric secretion as well as the volume and reduces hyperperistalsis and eliminates intestinal spasms.

Studies with  $S^{35}$ -labelled Secergan showed the extraordinarily high affinity of the drug to the intestinal mucosa. There were

no measurable amounts of radio-activity in the salivary glands at any time. The fact that the action of the drug is concentrated on the gastro-intestinal tract explains the virtual absence of side-effects in therapeutic doses.

Secergan is indicated in the treatment of peptic ulcer, gastritis, dumping syndrome, spastic colitis, and 'irritable colon'.

The preparation is also used as a spasmolytic in cholangiographies and cholangiographies as well as in X-ray examinations of the duodenum.

Secergan is available in bottles of tablets for oral use. The dosage is 1-2 tablets 2-3 times daily.

Further information may be obtained from the sole South African distributors, Westdene Products (Pty.) Ltd., P.O. Box 7710, Johannesburg.

### GREAT ORMOND STREET HOSPITAL PATTERN DISPOSABLE PLASTIC URINE COLLECTOR

Westdene Products (Pty.) Ltd. announce that the Great Ormond Street Hospital Pattern Disposable Plastic Urine Collector for male and female infants and children is now available.

The appliance is made in two sizes, small for babies up to 3 months with an 8 × 3 in. Chironseal bag and large for babies over 3 months up to 3 years with a 12 × 4 in. Chironseal bag.





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The bag is fixed to the infant's skin with the adhesive plaster which forms part of the appliance and urine is aspirated at half-hourly intervals via a catheter which is inserted through a small hole which is cut in the sealed polythene bag. It is

suitable for surgical patients provided that the operation area is not too close to that covered by the adhesive plaster.

Further information may be obtained from Westdene Products (Pty.) Ltd., P.O. Box 7710, Johannesburg.

### BOEKE ONTVANG : BOOKS RECEIVED

*Biochemistry for Medical Students.* 7th edition. By William V. Thorpe, M.A. (Cantab.), Ph.D. (Lond.). Pp. viii + 552. 30s. Od. net. London: J. & A. Churchill Ltd. 1960.

*Miscellaneous Notes.* 5th series. By F. Parkes Weber, M.D., F.R.C.P., F.S.A. Pp. 21. 5s. Od. net. London: H. K. Lewis & Co. Ltd. 1960.

*Growing up in Newcastle-upon-Tyne.* A continuing study of health and illness in young children within their families.

By F. J. W. Miller, S. D. M. Court, W. S. Walton and E. G. Knox. Pp. xxi + 369. Illustrations. 25s. Od. London: Oxford University Press. South African Office: Oxford University Press, P.O. Box 1141, Cape Town. 1960.

*Physiotherapy for Foot Ailments.* An introduction to chiropractic therapy. By J. Hardy Stirling, F.Inst.Ch., L.Ch., M.C.S.P. Pp. 72. 20 illustrations. 10s. 6d. plus 6d. postage. Bristol: John Wright & Sons Ltd. 1960.

### BRIEWERUBRIEK : CORRESPONDENCE

#### ALCOHOL AND TRAFFIC ACCIDENTS

To the Editor: At a conference held recently at the University of the Witwatersrand Medical School under the auspices of the Institute for the Prevention of Alcoholism I made the following statement with reference to the cost of alcoholism to the community: 'One-third of all traffic accidents are caused by drink. During the year 1959 the road casualties in the Union numbered 38,673 or 2,409 killed and 36,264 injured. This means that the Union's road casualties in 1 year alone have exceeded the War casualties, which numbered 23,269 in killed and injured, by more than 60%. The part played by drink in the toll of death and crippledom in the Union in peace-time can now be gauged'.

As my statement regarding the part played by alcoholism in traffic accidents has been challenged in some quarters, I feel obliged to invite attention to a study<sup>1</sup> of 500 consecutive highway fatalities in Baltimore, Maryland, USA, in which victims died within 12 hours after injury. The study revealed that 37.2% of 156 drivers killed were under the influence of alcohol or drunk, as were 26.3% of 137 passengers and 30.9% of the 207 pedestrians who died.

Results of the study, which covered motor-vehicle casualties from January 1951 to April 1956, were presented at the 9th Annual Meeting of the American Academy of Forensic Sciences in February 1957 at Chicago. A further breakdown of the figures revealed that 67% of the drivers under the influence of alcohol were less than 40 years of age and that 70.3% of the pedestrians definitely affected were above that age.

The State of Maryland has taken a most progressive step in establishing the official definition of the expression 'under the influence of alcohol' in terms of alcohol concentration. Thus, a law introduced in 1959 stipulates that an individual is in that condition if tests show alcohol concentrations of 0.15% by weight of his blood sample, an equivalent quantity of 2,000 ml. of his breath, or 0.2% by weight of his urine.

As the incidence of alcoholism and drunkenness in the Union is probably not less than in the United States, I consider that my statement herein referred to is hardly convertible.

2 Barbican Buildings  
Opposite City Hall  
Johannesburg  
18 January 1961

Louis F. Freed

<sup>1</sup> Alcohol and highway fatalities in Baltimore (1960): Publ. Hlth Rep. (Wash.), 75, 783.

#### TESTING AND CONTROL OF PHARMACEUTICAL PRODUCTS

To the Editor: Having read with interest the most informative article by Dr. J. H. Rauch<sup>1</sup> on the valuable work which is being done by the Pharmaceutical Products Laboratory of the South African Bureau of Standards, I would like to put forward some views, since I am responsible for the control of products of a pharmaceutical manufacturing company. Some of my views may support, and others modify, the statements which Dr. Rauch has contributed.

Dr. Rauch has rightly drawn attention to the importance of

adequate analytical control of pharmaceutical products: it is not only, however, a protection to the prescriber and the public, but also an indispensable necessity to the pharmaceutical industry. As one leading pharmaceutical analyst has recently stated,<sup>2</sup> 'In the pharmaceutical field no organization can operate successfully without the support afforded by the analytical chemist; no research worker, no production manager, no buyer, and no salesman could face his task today without the backing of a reliable analytical laboratory'. These considerations have been appreciated by many pharmaceutical manufacturers in South Africa and they have, for many years, equipped their factories with analytical control laboratories and employed competent analytical staff to undertake the necessary work. Thus Dr. Rauch's comment that before the Bureau established its laboratories, it had been necessary for industry to submit products to overseas principals for testing, should not be regarded as having reference to the pharmaceutical industry as a whole, but only to those manufacturers who had not established analytical control laboratories by 1950.

The selection of standards laid down by the *British Pharmacopoeia* and the *British Pharmaceutical Codex* as the basis for testing and control specifications in the fashion which Dr. Rauch describes is unavoidable in view of the legal enforcement of these standards. However, it should be appreciated that the wise pharmaceutical manufacturer will often choose to work to limits considerably more stringent than those permitted by the *Pharmacopoeia* or *Codex*, especially in the case of divided-dose preparations such as tablets, capsules and powders. Here, the analyst has to be sure that his determined tolerances would be sufficiently small to ensure that every random sample of 20 tablets taken from the batch would fall within the pharmacopoeial limits, since it is known that considerable variations in active ingredient contents of tablets are encountered.<sup>3,4</sup> In the manufacture of sterile products, the manufacturer must also undertake a series of checks and tests in addition to the pharmacopoeial tests for sterility, which should be regarded as only the final test in a series of controls.<sup>5,6</sup> These examples demonstrate that the control of pharmaceutical products based on a blind following of pharmacopoeial provisions alone is not sufficient: industrial experience and expert knowledge of the drugs used are also required. Thus the testing facilities offered for finished products by the Bureau, excellent though they are, cannot be regarded as a substitute for the analytical control which the manufacturer himself can provide, for it is the manufacturer who should be most fully aware of the properties of the substances he is processing and, by process control, the results of his laboratories should give the answer to manufacturing problems which may be encountered.

Dr. Rauch appears to have doubts that 'all is well in the field of manufacture of pharmaceutical products'. Although one cannot speak for all pharmaceutical manufacturers in this country, it is fairly safe to assume that many—if not the majority—are faithfully exerting themselves to the maximal extent in order to justify the reliance placed upon them by the medical profession and the public. They are controlling the purity and quality of their raw materials, ascertaining the stability of their products and marketing a preparation only when acceptable stability can be demonstrated. They are

controlling the steps involved in the manufacture of their products and subjecting the final products to a series of tests which ensure reproducibility of appearance, physical properties and potency.

B. A. Wills, B.Pharm., Ph.D., A.R.I.C., M.P.S.

Durban

19 January 1961

1. Rauch, J. H. (1961): *S. Afr. Med. J.*, **35**, 4.
2. Foster, G. E. (1958): *J. Pharm. (Lond.)*, **10**, 9T.
3. Train, D. (1960): *Pharm. J.*, **185**, 129.
4. Stuckley, R. E. (1960): *Ibid.*, **185**, 521.
5. Sykes, G. (1956): *J. Pharm. (Lond.)*, **8**, 573.
6. Wills, B. A. (1960): *S. Afr. Pharm. J.*, sci. suppl., i.

#### THE SECRETARY'S COLUMN

*To the Editor:* I should like to endorse most of Mr. Maurice H. Luntz's remarks in his letter.<sup>1</sup>

It would seem manifestly unfair that the application of private medical fees should begin only at the level at which supertax begins. The figure of £1,750-£1,800 is a far more realistic level, which would penalize neither patient nor doctor unduly.

May we turn, however, to the field of practical policies. Let us assume, for the sake of discussion, that 90% of the doctors in South Africa agree with Mr. Luntz. How would it be possible for this majority to set about revising the figure of £2,300 agreed upon by the Executive Committee of Federal Council? What steps are there open to the various local Branches to ensure that their mandate is carried out by their representatives at the top of a negotiating pyramid?

Perhaps Dr. Tonkin would devote one of his estimable articles to this aspect of the problem that faces the rank and file of the profession, namely inform those members, such as myself, who remain in the dark, precisely how the Medical Association of South Africa does in fact work.

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Cape Town

19 January 1961

1. Correspondence (1961): *S. Afr. Med. J.*, **35**, 40.

#### TREATMENT OF TRAUMATIC PARAPLEGIC PATIENTS

*To the Editor:* Mr. McMurray's plea<sup>1</sup> for the establishment of adequately-staffed and equipped paraplegic centres in this country is timely and certainly warrants the immediate urgent attention of all central and local hospital authorities. The modern treatment of paraplegics involving, as it does, the careful, coordinated services of orthopaedic surgeon, urologist, neurosurgeon and plastic surgeon, in addition to all the essential ancillary services that together constitute rehabilitation, is often of such long duration, requiring infinite patience and special skills, that it can only be carried out satisfactorily in special centres devoted to this type of injury.

It is surely a sad reflection on our medical services that South Africa lags so far behind in this respect—that no paraplegic centre as such, catering for all sections of the population, exists in this country, though such units are present in all other English speaking countries of the world.

While conditions remain as they are, paraplegic cases must obviously be treated, in the first place, where they occur, and often in smaller centres; it thus becomes most important that this initial so-called first-aid treatment should be as efficient as possible so that the patient's future may in no way be jeopardized.

While Mr. McMurray's article rightly stresses rehabilitation and the need for special centres, he devotes one paragraph to the early treatment of the bladder. His remarks here warrant—nay demand—this further comment.

Let it be said quite categorically and without any possibility of misconception, that the treatment he recommends is certainly neither modern, nor current at any paraplegic centre of which I have knowledge. Intermittent catheterization is always a poor and dangerous form of treatment, particularly in the paralysed bladder which is so much prone to persistent infection. The degree of infection in the bladder has been shown to be directly related to the number of times catheters have been passed. To discount the incidence of infection, as

he does by stating rather complacently that a normal aseptic technique is used, suggests a complete lack of appreciation of the fact that, even with the most aseptic technique, infection from organisms in the anterior urethra may and still does occur in the most skilful and careful hands. To state still further that the sepsis can easily be controlled by suitable modern drugs, suggests a complete disregard of the septic complications of both upper and lower urinary tracts that commonly occur even in the best paraplegic centres of the world. It is most surprising to note this apparently casual attitude to bladder sepsis from one whose daily surgery demands complicated 'no-touch' techniques to avoid sepsis in his own particular field: prevention of infection is as important in modern urology as in orthopaedic surgery though, for obvious reasons, more difficult—and particularly so in the paralysed bladder. It is this very sepsis that is the most important single factor in the mortality of paraplegics—both early and late.

While there is general agreement that these cases should, as a temporary expedient, be nursed in the larger centres, some fairly foolproof management of the bladder in the early and very important stages, remains imperative.

Continuous catheter drainage from the commencement is the accepted treatment for the paraplegic bladder, the catheter being passed with the strictest aseptic technique and strapped to the abdomen so as to obviate pressure at the peno-scrotal junction, with all its attendant complications. The calibre of the catheter should be small—after all, only urine will be draining, and the smaller the catheter, the less the possibility of urethritis and superadded complications. The catheter material should be as bland and non-irritating as possible—polythene is the preference in most centres ('portex' tubing is not yet available in South Africa) or a Foley latex rubber self-retaining catheter no larger than 16 F. A polythene catheter can be made by closing one end of ordinary size 4 tubing in the flame, shaping it to a smooth conical tip at the same time; eye-holes can be cut in the sides as necessary with a scalpel or razor blade. This catheter can sometimes be made long enough to go direct from bladder to bedside bottle without the necessity for connections and rubber tubing. Once in the bladder this catheter needs no change for up to 6 weeks, thereafter being replaced by a Foley 16 F. Where a Foley catheter is used, either initially or following on the polythene, weekly change of catheter is routine.

This initial period of catheter drainage may last up to 6 months, with one daily irrigation of the bladder when a Foley catheter is used: polythene catheters require no irrigation as a rule, except when phosphates deposit in excess.

In all instances closed drainage into a sterile bottle or plastic sterile polythene bag is employed.

Routine prophylactic treatment with a long-acting sulphonamide or 'furadantin' will minimize infection: regular urine cultures and sensitivity tests will reveal specific organisms not responding to the above treatment, so allowing the requisite antibiotic to be used only as and when required.

In this way overdistension of the bladder will be prevented, infection will be kept to a minimum, and a bladder with supple musculature will result—all of which are essential to achieve a satisfactory automatic bladder.

Despite the excellent results of modern treatment, it is pertinent here to stress that most paraplegic centres have found that progressive loss of renal function becomes common some 3 years after the time of injury (as judged radiologically). This finding adds further emphasis to the dictum that the paraplegic, however well he may feel and look, remains in constant need of regular skilled urological supervision which can best be given in a paraplegic unit.

It is to be hoped that Mr. McMurray's article will act as a timely reminder of the urgent and dire need for these centres in this country and will stimulate the authorities concerned to give it their attention, blessing and, perhaps most important, the necessary financial support.

I. Jacobson

706 Medical Centre

Heerengracht

Cape Town

19 January 1961

1. McMurray, T. B. (1961): *S. Afr. Med. J.*, **35**, 1.

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